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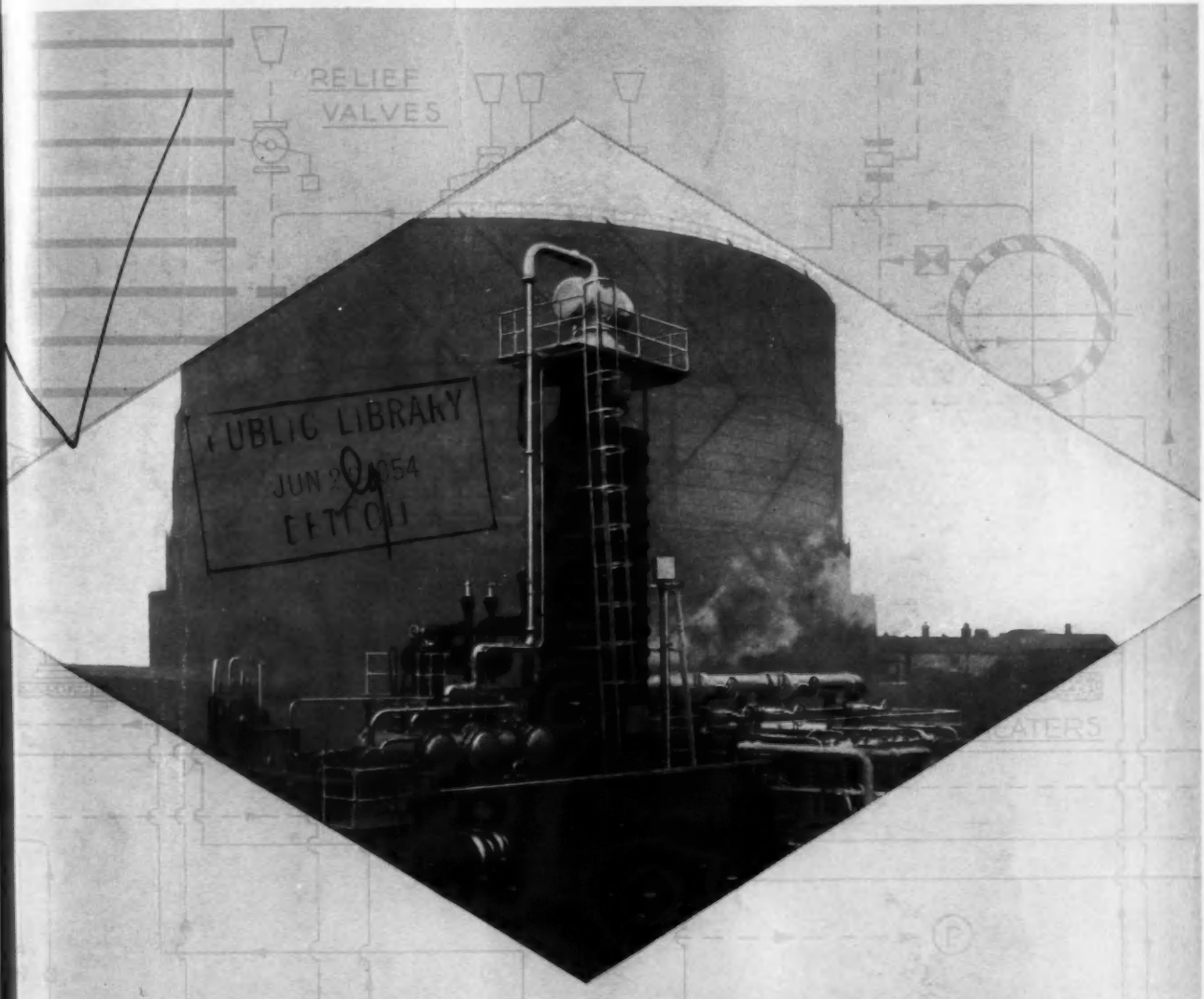
Gas Journal

VOL. 278 106TH YEAR. LONDON, JUNE 9, 1954 NO. 4749. PRICE 1/3



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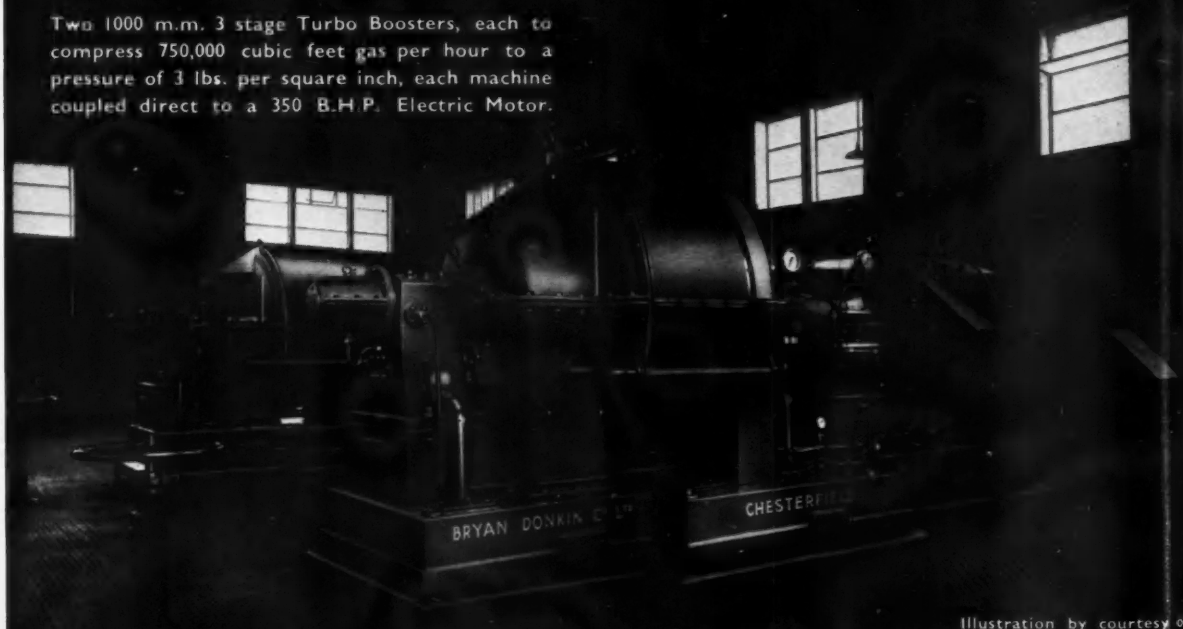

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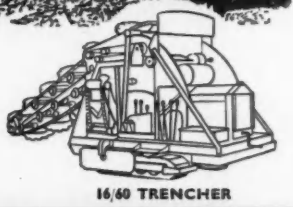

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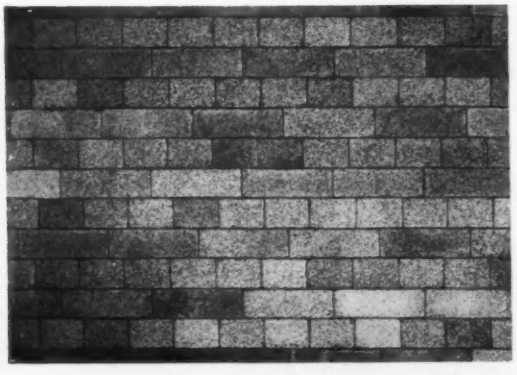

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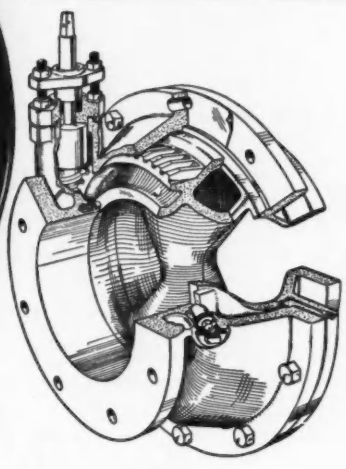

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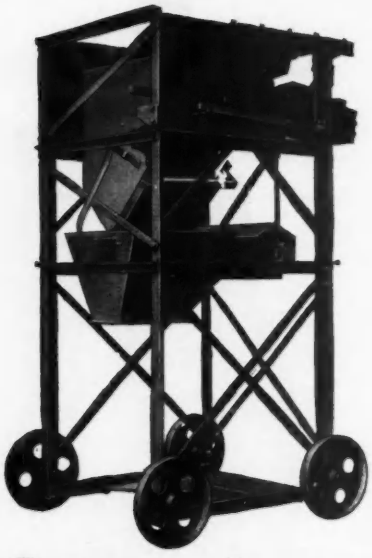

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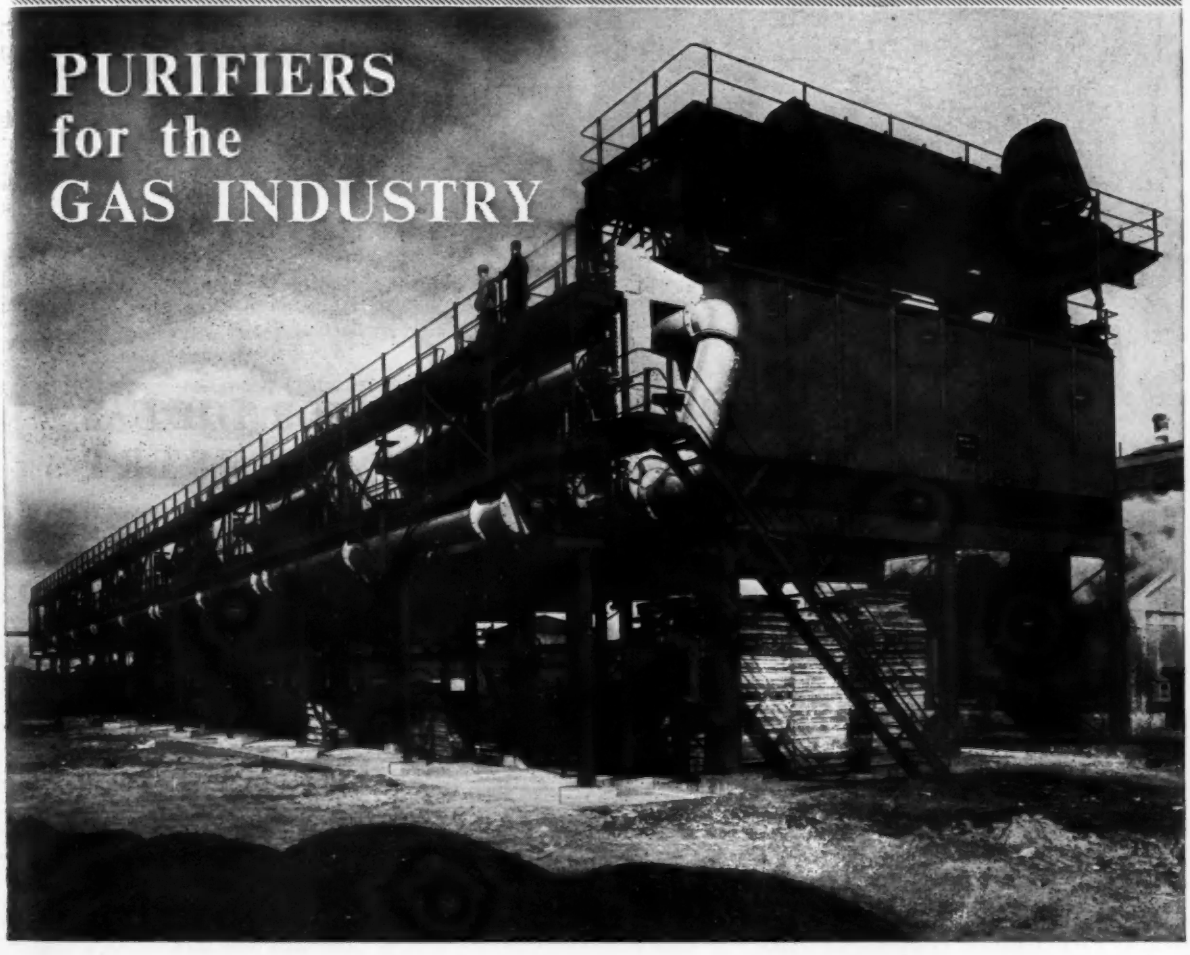

The illustration shows a recent installation at Warrington. It consists of five welded steel oxide purifier boxes, each 45 ft. 9 ins. by 35 ft. by 10 ft. deep, and was designed, fabricated and erected by Whessoe to the order of the North Western Gas Board.

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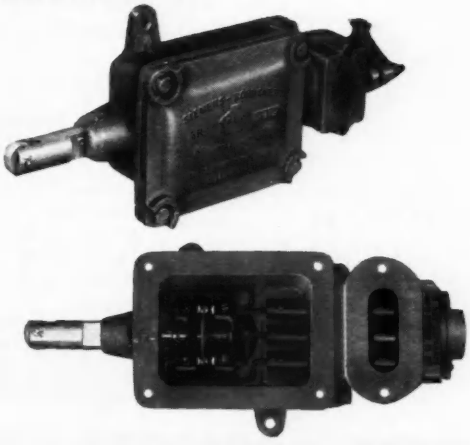

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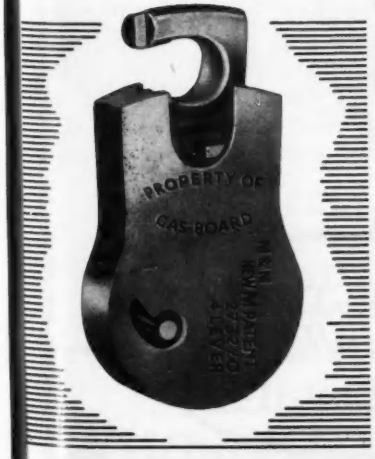

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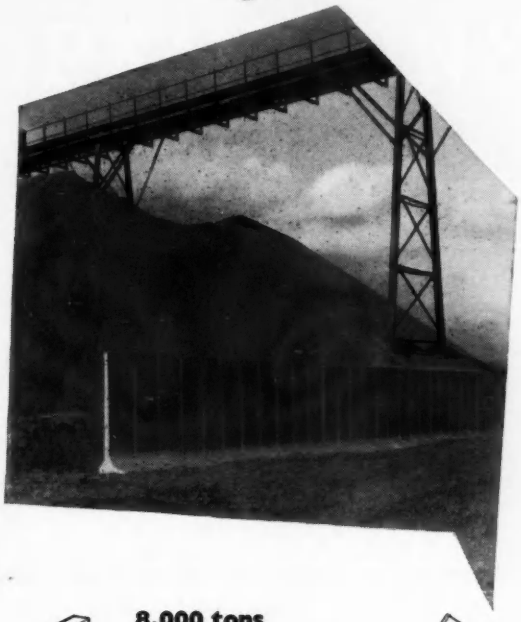

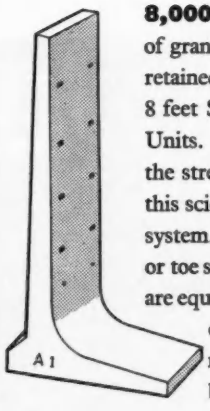

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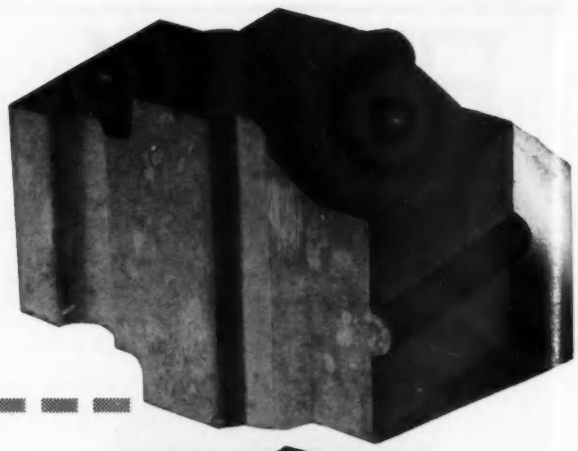
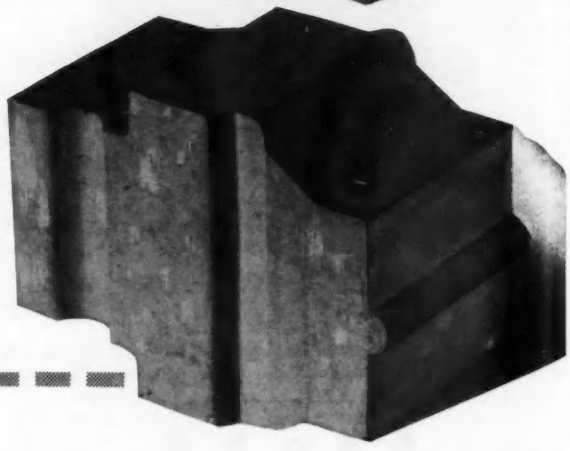


The same as This ?



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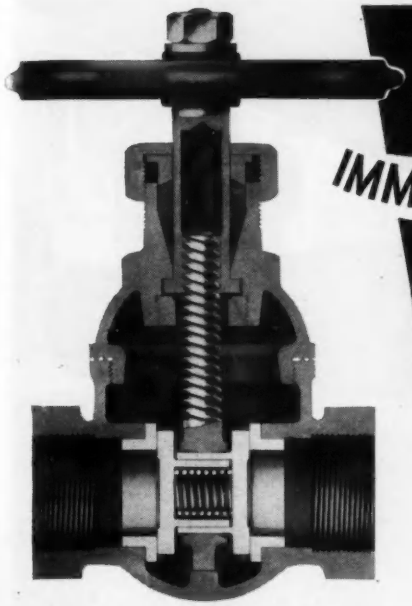

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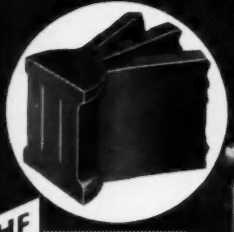

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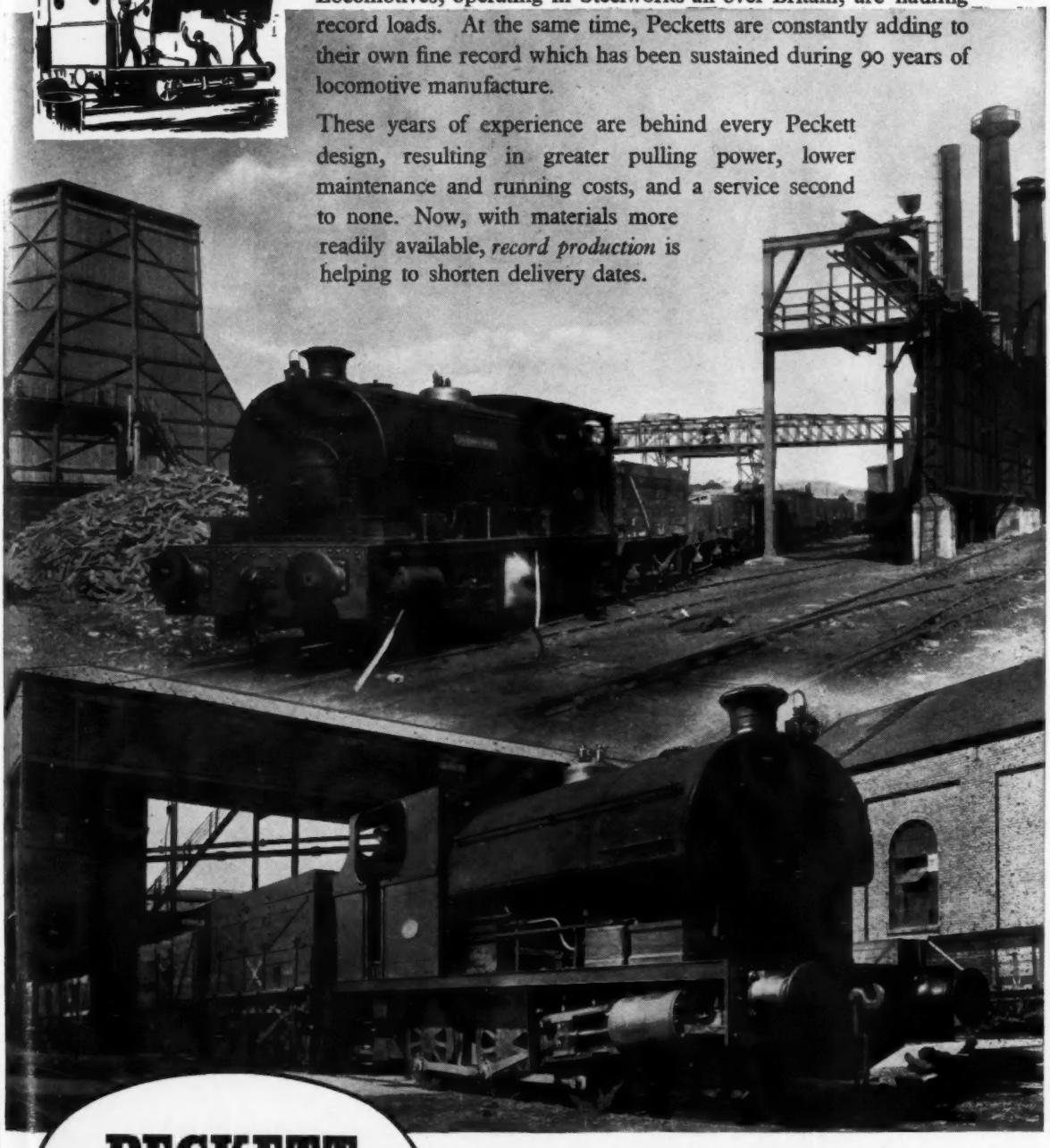

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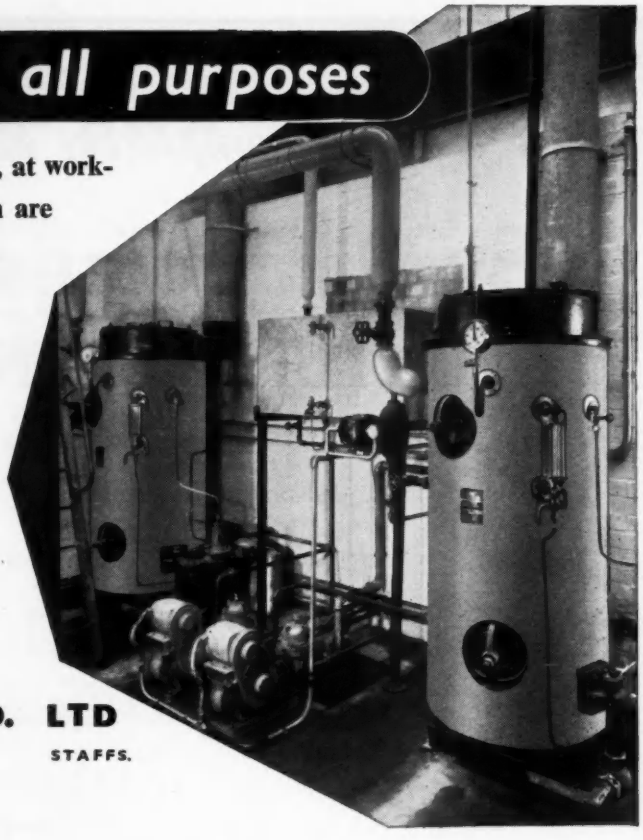

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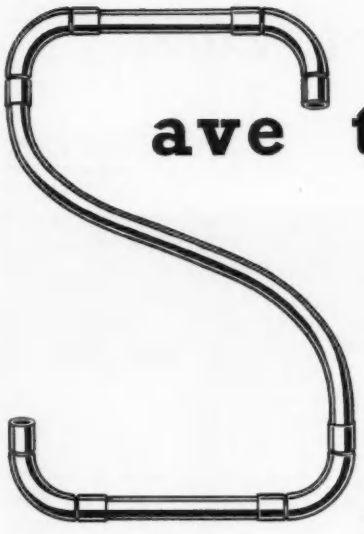

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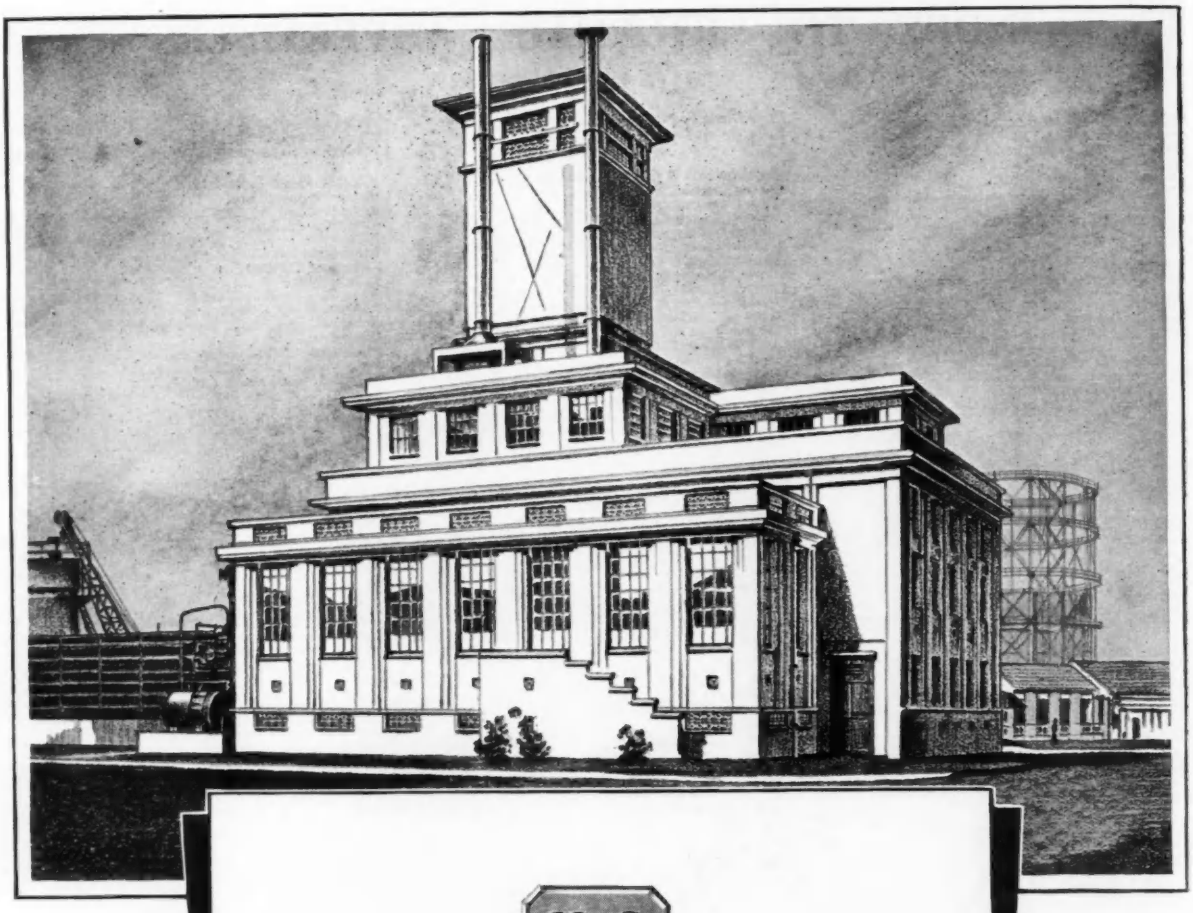

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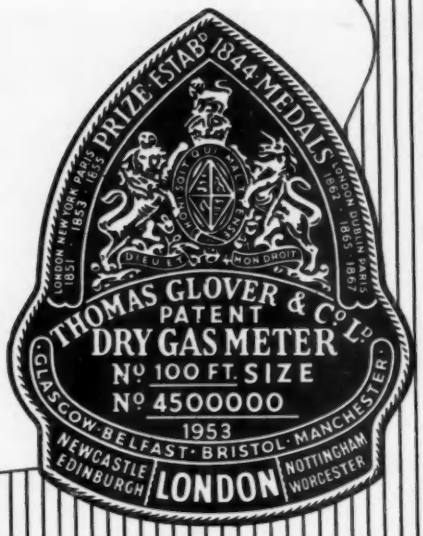

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Gas Journal

VOL. 278. No. 4749 106TH YEAR June 9, 1954

OPPORTUNITY AND ITS REALISATION

If the success of the annual general meeting of the Institution of Gas Engineers at Bournemouth was due to team work, as it undoubtedly was, equally assuredly it was an outstanding triumph personally to Mr. John T. Haynes, the President. His year of office has been quite remarkable for the virility, drive, and sense of purpose and encouragement shown on all occasions—and how numerous these occasions have been! Throughout, his ardent work has inspired enthusiasm in others; and his term of office increased his friends and enriched the respect felt for him by all in the gas industry. Ably supported by his wife, he has, by his faith and his unflagging energy, enhanced the prestige and status of the Institution of Gas Engineers; and the deep and sincere appreciation of his work expressed at the Bournemouth conference was his due. And we may comment that the momentum of the meeting and the rich variety of topics discussed were in no small measure due to the abundant vitality of Jack Haynes.

Naturally in his Presidential Address Mr. Haynes referred to the unique honour he enjoyed in representing the Institution at the Coronation of Queen Elizabeth II. And his reflection must be pleasant that he was able to attend the annual meetings of four national gas associations of other countries which, in common with the Institution, are members of the International Gas Union. Warmth of welcome was the characteristic of these events; and this is all to the good in cementing goodwill and creating common understanding. And it is a proud record that during his year as President he visited all the Sections of the Institution and all but one of the Junior Associations. He comments: 'The outstanding impression I have obtained is that the high quality of the young men who are coming forward inspires a healthy confidence in the future of the industry. Good engineers live and thrive on the success of their ingenuity and inventiveness. The morale of the many excellent men, both young and old, in the gas industry will be lowered if their initiative is unduly restricted, and I would urge the gas boards to allow a very considerable degree of freedom to the rising generation and not to bind them to rules of procedure.' We have quoted Mr. Haynes at length, for the simple reason that we thoroughly endorse his sentiment in this regard. It holds much significance.

The basic theme of the address was the opportunity presented by nationalisation of the gas industry and the need to grasp this opportunity. We have now had five years of transition since vesting date, and the industry may now be said to have settled down under the new organisation. The President considered the annual general meeting at Bournemouth as opportune to consider some of the opportunities which the Gas Act, 1948, made available, and to measure the use made of the opportunities presented. He was quite outspoken on the subject of the status of the 'engineer and manager.' At the time of the passing of the Gas Act, there were about 600 men holding this rank; and they were men of independence, and, subject to ability and personality, a man's views and opinions carried equal weight with his colleagues. With the organisation of the 12 area boards few of those engineers and managers have retained the same measure of independence. As Mr. Haynes remarked, many have had their spheres of responsibility increased. Others have been subordinated. There has been a feeling that the old independence has been lost; but did this very independence militate against a constructive policy for the gas industry as a whole?

Discussing the old parochial outlook, Mr. Haynes said: 'We have reason to be proud that, on the introduction of nationalisation, many of those who were most prominent in progressive thought in the industry were given positions of responsibility which have enabled them to exercise their talents far beyond the limits of their former localities, and there is no doubt that their influence has been for the good of the industry' There are still some who nurse grievances about their lost status. It is Mr. Haynes' view, who is quite unafraid of grasping the nettle, that such fail to realise that without the initiative and drive of their more adaptable colleagues the gas industry would decline and they might lose not only their rights, but their livelihood. Harsh thinking, maybe, but there is much truth in it.

Having mentioned that, prior to nationalisation, current legislation made it difficult for enterprising managements to effect extension of boundaries to achieve the economies possible by larger organisation, the President referred to the Gas Act as sweeping away very many

difficulties; and although there was some hesitation five years ago to acknowledge the opportunities, the gas industry is now working in a way which is not only the envy of many in the other nationalised industries, but which has the approbation of both its political sponsors and their opponents. On nationalisation one of the first realisations was the appalling condition of some of the small rural undertakings. After five years of nationalisation, the rural areas have a better service of gas, better sales and service, and in some instances a lower price of gas in spite of the crippling increases in the cost of coal. And, said Mr. Haynes, 'we can be proud of our achievements under the Gas Act of 1948 . . . Already the higher efficiencies resulting from the work which has been completed has enabled area boards to keep gas prices much below those which would have been justified by the tremendous increases in the costs of coal, wages, transport, and material.'

The Presidential Address is full of thought and this note is merely a pointer to it. But, on this subject of opportunity there can be little doubt that the status of the distribution engineers has been raised; and how thoroughly they have justified their new, their enhanced status under integrated distribution conditions. Again on this matter of opportunity we would underline that the gas industry is much larger than Imperial Chemical Industries, Unilever, General Electric Company, or any of the aircraft industries. The opportunities for young men entering the gas industry were never so great.

SELLERS' MARKET DISAPPEARS

An industrial magnate is reported to have countered a question as to whether capital, labour, or brain was the most important element in big business by asking which leg of a three-legged stool was the most indispensable. Perusal of the 49th annual report of the Society of British Gas Industries, to which we make extended reference on another page, suggests a similar relationship between the machinery of the nationalised gas industry, as represented by the Gas Council and the area boards, the Institution of Gas Engineers, whose members are drawn from the professional ranks of all sides of the industry, and the S.B.G.I., which will, next year, attain the golden jubilee of its service to the industry from the standpoint of planning and erecting plant for the manufacture and distribution of gas and of designing and manufacturing an ever widening range of gas and coke appliances.

The Gas Act gave the Gas Council powers 'to manufacture plant required by area boards, to sell or supply such plant to area boards, and to install, repair, maintain, or remove such plant'; and also 'to manufacture gas fittings and coke fittings except for export, and to sell or supply such fittings'. When nationalisation was a new and almost untried experiment it was proper that such powers should be available, but in practice there was never any doubt that those who constitute the S.B.G.I. would continue to serve the best interests of the industry. Indeed, there is evidence that since the supply side has been publicly owned it has been even better served by private enterprise. The interests of the two sides are completely mutual, and their professional personnel—who perhaps do not move quite so freely from one side to the other as in pre-vesting days—meet on common ground in the Institution of Gas Engineers, whose meeting at Bournemouth last week was so successful.

Members of the S.B.G.I. may well claim some of the credit for the 13% increase in the quantity of gas sold since the year before nationalisation, for there has been increasing co-operation between them and the Gas Council in matters of publicity, Press, and information services. The latest example of this was the fact that at the recent Gas Sales and Service Conference at Southport there was not only an ample display of appliances but two of the most interesting papers were presented by representative members of the Society. One of the most important directions in which the S.B.G.I. and the Gas Council are working together is the task of securing agreement on the adoption of conditions of contract to govern the supply and erection of plant; while an interesting feature of the long tradition of co-operation with the Institution is the fact that candidates from among S.B.G.I. members and from the area boards are able to share in the benefits of the courses in management studies at the Brooklands County Technical College. While the report records no outstanding results from joint research it does indicate that joint consultation on all aspects of research between the Gas Council and the Society is running smoothly and with promise of long-term success.

Rising steel production seems to have created an impression that the consuming industries will be able to obtain ample supplies of all the grades of steel required, but that has not yet been the experience of members of the S.B.G.I.; indeed, there has been difficulty in getting supplies of heavy steel plate for gasworks plant, and there would appear to be a need for the steel industry to increase its rolling facilities for heavy plate. Manufacturers engaged in the production of appliances have welcomed the removal of restrictions on promotional publicity, the slight reduction in purchase tax under the 1953 Budget, and the subsequent lifting of hire purchase limitations on water heaters, but consumers are still not as free of restrictions as they should be, with the result that old and less efficient appliances are being retained in use, and the public are denied reasonable facilities for replacing smog-producing appliances by efficient smokeless appliances.

Export business was better in 1953 than in 1952, but there is still not complete recovery from the serious effect of the restrictions imposed in the Australian market. The report says new fields that are opening up where bottled gas or natural gas are available offer scope for future development, and members of the Society are active in seeking to establish themselves in such markets. The sellers' market has gone, and a period of increasing international competition throughout the world seems inevitable.

HUMAN RELATIONS IN INDUSTRY

The committee on human relations in industry, set up jointly by the Department of Scientific and Industrial Research and the Medical Research Council, states in the report of its first year's work (Stationery Office, 1s.) that it has approved 12 research projects out of 78 applications submitted for consideration. The work is to be undertaken by university and industrial research organisations. Among the subjects approved for research are incentive schemes and their effect on productivity, a study of the effects on workers of incentive payment systems, incentives for management, technological change and social organisation in industry, and a comparative study of some production systems in mining.

Personal Notes

MR. GEORGE BINGHAM, Sales and Service Manager for the Leicester district of the East Midlands Gas Board, has been elected Chairman of the Leicester Publicity Club.

MR. KEITH L. STOCK, Under Secretary, Gas Division, Ministry of Fuel and Power, has been promoted to an important position on the Cabinet Secretariat, and is being succeeded at the Ministry by MR. OWEN FRANCIS, formerly of the Coal Division.

MR. DAVID RUSSELL YOUNG, Engineer and Manager of the Barbados Gas Company, since 1945, has resigned that position to take up residence in New Zealand. Pending a new appointment MR. H. SISNETT is acting temporarily as Manager.

MR. L. R. MEEK has been appointed Manager of the Gas Department of Henry Balfour & Co., Ltd., in succession to MR. A. C. BUREAU, who is now Director and General Manager of Balfour Lecocq, Ltd. Other appointments include MR. A. H. SMALL as Deputy Manager and MR. P. LOW as Technical Assistant. MR. J. C. W. BOOTH, who joined the firm earlier this year in a technical capacity, has taken up the post of erection supervisor.

MR. LESLIE O'CONNOR, C.B.E., has been appointed Chairman of Council of the British Coke Research Association in succession to MR. G. A. HEBDEN, who has retired after serving as Chairman for a period of five years. SIR CHARLES ELLIS, F.R.S., Scientific Member of the National Coal Board, DR. R. J. MORLEY, Director General of Carbonisation, National Coal Board, and MR. S. KELLETT, of the South Yorkshire Chemical Works, Ltd., have been appointed members of the Council.

COUNCILLOR BENJAMIN POLLARD, a Director of W. J. Jenkins & Co., Ltd., Retford, was installed Mayor of Retford for the ensuing year on May 31. Councillor Pollard, who is a Loughborough man, has lived in Retford for nearly 30 years. After having held important executive posts, he was made a Director of his firm in 1943. He has been a member of Retford Town Council since 1946, and was elected a County Councillor in 1952. He is Chairman of the Retford District Juvenile Advisory Committee, a Vice-President of the Retford branch of the Bassetlow Conservative Association, and is a keen golfer.

MR. WILLIAM YOUNG, Manager of the Doune Gas Undertaking for the past eight years, who has 52 years service, was one of a number of recipients of long service presentations at the hands of MR. D. D. MELVIN, Member of the Scottish Gas Board, at a ceremony at Stirling recently. He received a radio set. His son was recently appointed District Manager at Golspie. Another radio set was presented to MR. GEORGE LAPSLEY, Stirling, who has over 40 years service. MR. JOHN MORAN, who died a few weeks ago, was also due to receive an award after 43 years service. His widow was presented with a gift. Mr. Moran's father also served for 46 years at Stirling—a total of 90 years for father and son. MR. H. AITKEN, who recently retired from the position of Gas Manager at Leven, Fife, also received a long service award.

ALDERMAN W. R. COWEN, O.B.E., a member of the North Thames Gas Consultative Council, has been elected Charter Mayor of the newly-created Borough of Harrow.

PARKINSON STOVE CO., LTD.

A number of changes in representation have been announced by the Parkinson Stove Co., Ltd. MR. J. G. RENTON, who has looked after their interests in the Southern Gas Board area, left on May 31 to take up an appointment as Sales Manager to a company manufacturing aircraft components. On July 1, his post will be taken over by MR. E. J. DUCKER. At present Mr. Ducker is the Area Manager of the Northern and North Eastern Gas Board areas, and the vacancy created by his transfer will be filled by the appointment of MR. W. Q. FOSTER, of Harrogate as Area Manager.

Mr. E. J. Ducker

Mr. W. Q. Foster

For the past eight years Mr. Foster has been the Scottish and Northern Manager for Walter King, Ltd., publishers of the 'GAS JOURNAL' and 'GAS SERVICE.' Prior to this he represented Peebles & Co., Ltd., in Scotland and the North of England. Mr. Foster held this appointment from 1935 to 1946.

WALTER KING, LTD.

Regarding Mr. W. Q. Foster's appointment by the Parkinson Stove Co., the Directors of Walter King, Ltd., would like to record that they have always looked back with pleasure to their meeting with him on a bowling green in Scotland in 1946. Mr. Foster will carry with him to his new sphere of activity the hearty good wishes of all his colleagues at 11, Bolt Court.

MR. PHILIP W. B. KING is appointed Northern Manager in place of Mr. Foster, and in the near future will move residence to Harrogate. Mr. Philip King, on demobilisation from the Essex Regiment early in 1948 went for six months' instruction with the United Kingdom Gas Corporation, and for shorter periods with Radiation Ltd. and West's Gas Improvement Co., Ltd. Subsequently, he has represented the 'GAS JOURNAL' and 'GAS SERVICE' in the Eastern and Southern Counties and in a considerable section of the Metropolitan Area.

MR. ALEC ENGELHARDT has been appointed in Mr. Philip King's place. Mr. Engelhardt is not a newcomer to the gas industry, having held appointments with Ascot Gas Water Heaters, Ltd., before the war and after release from the Army in 1947. In 1939 he was embodied as a serving Territorial gunner, and was commissioned soon after the outbreak of war. He served in the Far and Middle East and in Europe. Subsequently, he was transferred to the Intelligence Corps with the rank of major.

COUNCILLOR A. B. CONSTABLE, of Dover, has been re-appointed Chairman of the South Eastern Gas Consultative Council.

MISS ALMA MARGARET ALEXANDER, elder daughter of Mr. and Mrs. J. R. W. Alexander, was married at Reigate on May 29 to MR. DONALD CHARLES MCARTHUR, eldest son of Mr. and Mrs. J. C. MCARTHUR, of Sandford, Reigate.

SIR GUY NOTT-BOWER, K.B.E., C.B., who has been Director of Public Relations of the National Coal Board since 1948, has retired. Sir Guy was formerly Deputy Secretary of the Ministry of Fuel and Power. In accepting his retirement, the Board recorded its appreciation of the services Sir Guy has rendered to the coal industry over the past 34 years, at the Mines Department, the Ministry of Fuel and Power, and latterly at the National Coal Board. Sir Guy Nott-Bower was the first Secretary of the Miners' Welfare Committee (later Commission) in 1921, and from 1923 to 1927 was Secretary to the Royal Commission on Mining Subsidence. During the fuel crisis in 1947, he acted as the official spokesman for the Government at the special Press conference held each day to report on the latest situation.

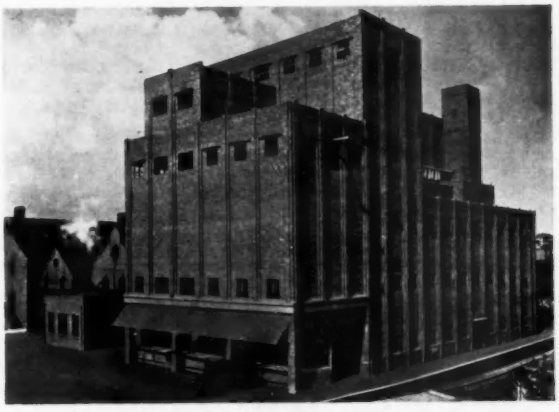
MR. DAVID EVAN WILKINS, of Mumbles, retired from the staff of the Wales Gas Board's Swansea undertaking on attaining his 65th birthday, and thus concluded 52 years of service to the gas industry. Mr. Wilkins started with the Neath Corporation Gas Department in 1903, and after service with the Margam U.D.C. Gas Department joined the staff of the then Swansea Gas Light Company as a fitter, subsequently being promoted to district inspector. Within the industry his qualities were recognised by his appointment to the Council of the Wales and Monmouthshire Junior Gas Association, on which Council he has served for 12 years, being President of the Association in 1946/47. Mr. Wilkins, who recently received the Board's 50-year long service and good conduct award, takes a prominent part in the ecclesiastical life of the Mumbles and is a member of several bowls clubs.

Obituary

MR. A. J. STURGEON, Managing Director of Foster Electrical Supplies, Ltd., and a Director of Foster Transformers, Ltd., died on May 26. He was 66 years of age. Mr. Sturgeon's association with the Foster organisation commenced in 1911 and he became actively connected with the lamp world through the Electric Lamp Manufacturers' Association, in which the Company did a great deal of pioneer work. When in 1944, due to the greatly expanding business of the Foster organisation, it was decided to form Foster Electrical Supplies, Mr. Sturgeon became the first Managing Director.

NEEDS OF A PROGRESSIVE AGE

Modern Appearance, High Efficiency Characterise the New 'W.D.' Plant at Jersey



Exterior of the new retort house at the Jersey works.

It is nearly 125 years since coal gas was first produced in Jersey. A century and a quarter is not long when compared with Jersey's past. Jersey has many stories to tell of the Age of Chivalry, when the Constable of France, in 1373, and Victor de Pontbriand and later de Maulvrier, laid siege to the stone battlements of Mont Orgueil. As late as 1781 Jersey was a battleground, when de Rullecourt met and was vanquished by the heroism of the Jersey people led by the gallant Major Peirson. Not until the peace of 1814 was Jersey able to feel secure and to play her part in that momentous phase of world history —the industrial revolution.

In that story the gas industry has a leading role. Indeed, much that was achieved would have been impossible without this source of fuel. Gas was the first of the 'utility' industries, preceding the railways and the other services by many years.

In 1830 Jersey had its own gasworks, the first in the Channel Islands. Thomas Edge was the moving spirit behind the Jersey enterprise. In 1831 his own premises were the first to be lighted by gas. On March 16, 1831, *L'Impartial* devoted a long article to the inauguration of gas in Jersey. Thomas Edge had put in the Royal Square a star with the letters 'A.R.'. Among other premises lighted on this occasion were those of Guiton & Perchard, a Mr. Larbalastier, A. de Gruchy, Mr. Balcam, Mr. Saunders, British Hotel, and Mr. Foote, Chemist.

A certain amount of local prejudice had to be overcome before gas was accepted as a safe and desirable form of lighting. It was not until January 10, 1837, that it was finally agreed to install gas in the Town Church. But by 1856, when the undertaking was sold to the founders of the present Company, gas was firmly established for domestic as well as for commercial use. No fewer than 241 private houses had by then installed gas. Most of the Island's shops had adopted this form of lighting.

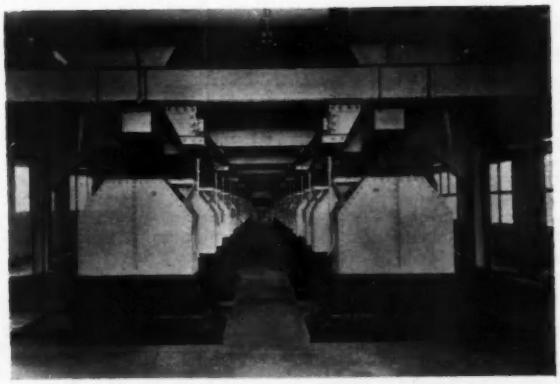
During 1862 gas output at the Jersey works stood at 36 mill. cu. ft. By 1894, with the invention of the incandescent gas mantle and the developments to cookers and fires, it had reached 125 mill. cu. ft. per annum.

In 1918 the Company was incorporated by Act of the States of Jersey as the Jersey Gas Light Company, Ltd.; and from 1918 to the beginning of the second world war the story of Jersey gasworks was one of continuous progress. Production expanded adequately to meet the increasing demands of more and more consumers.

The following few figures indicate how far Jersey has progressed since 1894:—

Year	Cu. ft. of Gas Made	Numbers of Consumers	Miles of Mains
1895	144 mill.	3,254	33
1946	383 mill.	12,070	110
1953	574 mill.	14,161	125

In 1940 the phase of development ended abruptly because of the German invasion. The next four years were a period of shortage, difficulty, and danger. In face of diminishing stocks of fuel and lack of spare parts for machinery and plant, the whole resources of the Company had to be devoted to preventing a breakdown of gas supplies. A system of elaborate false returns had to be devised to prevent the occupying forces from impounding supplies. In September, 1944, supplies of coal were finally exhausted. From then until the liberation in May, 1945, the gasworks was closed down. Tar was used for fuel during the winter of 1944-45.



The top charging platform as seen from the centre.

After Liberation

Immediately on liberation, Jersey set to work to put her house in order. It was anticipated that, in common with other gas undertakings, the end of the war would mean a great increase in demand. Plans were prepared for an expansion entailing the building of a new carbonising installation to produce over 3 mill. cu. ft. of gas per day. The order was placed with the Woodall-Duckham Construction Co. for a bench of 28 retorts having a total carbonising capacity of 190 tons of coal a day.

The provisions were amply justified. Due to Jersey's favourable position as a holiday resort without currency restrictions, and with the return to the Island of its former inhabitants, the old works was, to say the least, overloaded. In the winter of 1951-52 and 1952-53, despite an output double that of pre-war years, there was grave danger of failure. However, such was the shortage of materials in the United Kingdom that it was not possible to begin work on the new retort house until early in 1952. On January 3, 1952, the late Senator le Marquand, President of the States of Jersey Public Works Committee, placed the first concrete in the foundation trenches. Since then work has gone on apace. The old gas-making plant, the retort house with its massive walls and links with the

old century, has been superseded. In its place is a retort house of modern architectural design, totally unlike the traditional picture of a gasworks, embodying the gas industry's answer to the needs of a progressive age.

The New Carbonising Plant

The new carbonising plant comprises one bench containing 28 Woodall-Duckham lambent-heated continuous vertical retorts capable of carbonising 190 tons of coal per day and of producing therefrom 3,141,000 cu. ft. of 482.5 B.Th.U. gas. The retorts are heated by hot producer gas generated in four step-grate producers with a fifth producer acting as standby. The installation is provided with complete coal and coke handling and coke screening and storage plants, a waste heat boiler, and with dust extraction, vacuum cleaning, and cold air circulating plants. The carbonising plant has been designed for extension in the future by the addition of a second bench of retorts and is erected in a steel-framed brick-panelled retort house architecturally designed to present the most attractive appearance.

As mentioned, the retorts are heated by the lambent system in which the flow of heating gases takes place in an upward direction through heating flues so designed that the gases travel backwards and forwards from end to end of the retort during their natural upward flow.

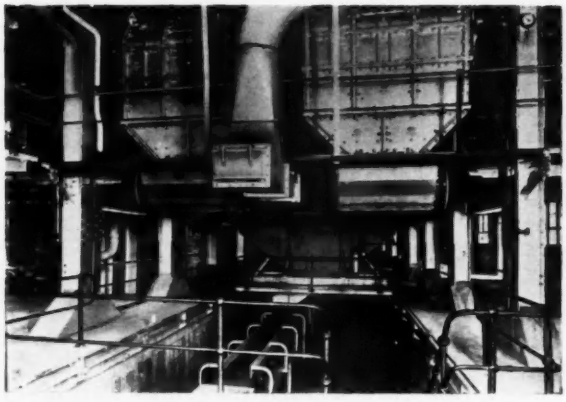
A view beneath the coke dischargers, showing the coke belt conveyor.

There is only one point of admission, and control of producer gas on each side of each retort is located in a readily accessible position in the setting outside wall. The secondary air, having been preheated by circulation around the retort setting and supporting steelwork and within the setting, is admitted to the heating flues at three or more levels. Its distribution is controlled by dampers located in the setting outside wall. The arrangements for preheating the secondary air not only cools the retort settings and supporting steelwork and safeguards them against overheating, but it also enables the producer fuel consumption to be reduced by some 7%-10%.

The foul main is fitted with a butterfly valve operated by an Askania regulator which controls the pull on the retorts. To clear the gas mains of air at starting-up or after shut-down periods, a blow-off pipe is provided. Also an emergency relief valve has been fitted. The hot liquor from the sprays flows back into the collecting mains and thence via the cleaning wells over a weir to the tar and liquor separating tank.

Producers

To supply the gas for heating the retorts, five producers are provided in a separate battery at the retort house floor level at one side of the bench. The producers are



A view beneath the retorts, showing coke hoppers and travelling chute feeding belt conveyor.

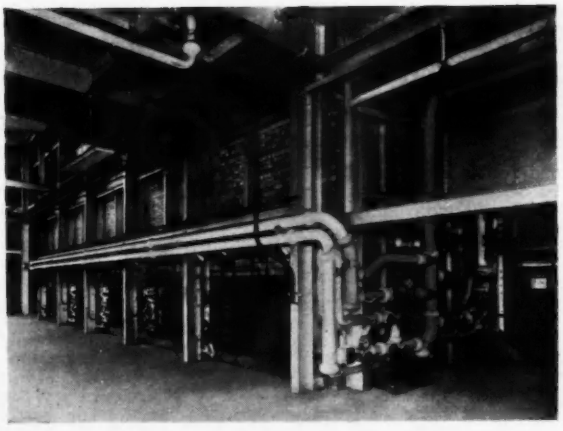
arranged so that any producer may be shut down without interfering in any way with the working of the other producers. The gas from all of the producers passes into a common flue and may be taken to any of the retorts. The producers are of the step-grate type with grate areas such that any four producers together shall have ample area for the efficient heating of 28 retorts when using run-of-retort coke as fuel. To give the producers maximum flexibility as regards both producer gas output and quality of fuel used, the producers are worked under pressure.

Power and Steam Supply

All power-operated units on the coal handling plant and the coke handling and screening plant are driven by totally-enclosed, dust-proof, gasworks-type electric motors, electrical sequence interlocks being provided to prevent these units from being started up out of their proper order. The same type of motor is used to drive the lift, waste heat boiler fan, Askania regulator pump, dust extraction fan, vacuum cleaning exhauster, and cold air circulating fan. The coke extractors are operated by two vertical non-condensing enclosed steam engines, one of which is a standby. The whole of the steam required for the retorts, producers, extractor engines, feed water pumps and liquor pumps is supplied by the waste heat boiler; and there is a surplus of some 5,000 lb. per hour for works use.

Design of Retort House

Care has been taken in the architectural design of the retort house to preserve the functional character of the building and yet present an attractive appearance. The retort house and the coke screening plant house form integral parts of an imposing block of steel-framed brick-panelled buildings. The lift structure and the chimney



Battery of step-grate producers.

Interior of the generator house.

which rise above the retort house are enclosed in brick-built towers which harmonise with the house. All external steelwork is enclosed, and multi-coloured sand-faced bricks have been used throughout the building. All internal wall surfaces within the retort house and coke screening plant house have been finished in silver-grey 'Snowcem.'

At the retort house top charging platform level a mess-room, locker-room, and lavatory with showers are provided for the operatives employed on the plant. These rooms have walls finished with cream-glazed tiles up to the ceilings and floors surfaced with red unglazed tiles.

To prevent pollution of the air within the retort house by coke dust during the discharge of a retort, dust extraction hoods are fitted at the coke dischargers and connected by ducting to washer filter units outside the retort house building. To assist the maintenance of cleanliness within the retort house a vacuum cleaning plant has been provided with hose coupling points distributed throughout the plant. The exhaust unit and filter of this plant are located within the retort house at ground level. A cold air circulating plant provides a supply of cool air at the top damper platform level and promotes air circulation.

[The photographs illustrating the plant are through the courtesy of the Jersey Gas Light Company, and the Woodall-Duckham Construction Co., Ltd.]

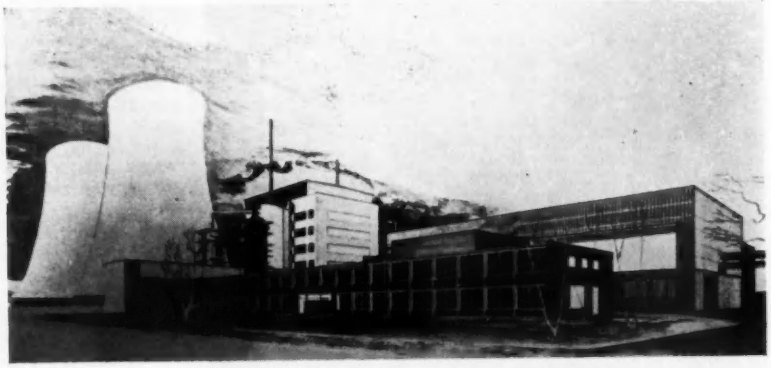
BRITAIN'S FIRST ATOMIC POWER STATION

Steam is still of fundamental importance even in this so-called 'Atomic Age.' The new atomic power stations being built will require steam as a working medium. The complete steam generation equipment for the new Calder Hall power station in Cumberland, we learn, has been entrusted to Babcock & Wilcox, Ltd.

A block model of the station has been widely exhibited for some months now, from which it can be seen that the layout comprises a central turbine house with nuclear reactors located at either end. Each reactor is associated with four steam-raising towers approximately 80 ft. high which, with their vertical arrangement, suggest oil refinery practice rather than conventional boiler plant. Heat which is generated in the graphite-moderated uranium reactors is conveyed to the steam plant by carbon dioxide under high pressure. The hot gas gives up its heat to preheating, evaporating, and superheating sections of the steam plant. After passing through the steam raising towers, the cooled gas is recirculated by powerful blowers back to the reactor, where the cycle is repeated.

One of the most interesting features from a technical point of view is the use of a double-pressure steam cycle, described by Sir Christopher Hinton in his James Clayton Lecture, 'Nuclear Reactors and Power Production,' given to the Institution of Mechanical Engineers last February. Each tower contains, in effect, two separate sets of steam-raising equipment, there being separate high-pressure and low-pressure economisers, evaporators, and superheater sections, each with its own drum and feed pump. The turbine plant will be designed with a low-pressure section which will receive live steam direct, as well as steam which has already been expanded in the high-pressure blading. To obtain the maximum heat transfer within the towers all heating surfaces are of stud-tube construction to give extended surface. The studs are flash-welded and have smooth surfaces and a profile giving good aerodynamic properties.

Design of the internal heating eliminates joints inside the pressure shells except those which, once completed in the shops and exhaustively tested, will not be required to be broken throughout the anticipated life of the plant. In addition, the high pressure of the coolant gas (due to the need for economy in blower power) requires the whole system to be built to withstand this pressure without any possibility of leakage. The long experience of Babcock and Wilcox in the production of large fusion-welded pressure vessels to fulfil the most stringent requirements has no doubt played a significant part in establishing the feasibility of a project of this size.



Architectural drawing of Calder Hall (Ministry of Works picture).

The atomic station at Calder Hall has no chimneys in the generally accepted sense, since no coal or oil is being burned. Two comparatively small vent pipes are provided on each reactor house for extracting any heat loss from the reactor which is not transferred to the steam towers. Filter plant is provided to ensure that no atmospheric dust particles are discharged in a radio-active condition.

In years to come, one may perhaps look back on the Calder Hall plant with a critical eye as to its crudity. There is, in fact, little that is orthodox about it. At the same time, the closest possible approach to orthodoxy has been made in the design and construction of the steam plant. The part allocated to Babcock and Wilcox includes the complete steam towers and their associated feed pumps, etc. The reactors are being built by the Department of Atomic Energy, the pressure vessel, or outer shell for the reactor being made by Whessoe, Ltd. The circulating gas blowers and pipework are by C. & A. Parsons & Co., Ltd., who are also supplying the turbo-alternator plant. The main contractors for the station building are Taylor Woodrow.

An Indication that Bangor Borough Council is still hopeful of an amalgamation of its gas undertaking and that operated by Newtownards Borough Council was given by the Mayor of Bangor (Alderman Bailie) at a social function attended by the members of both Councils at Newtownards. Referring to a proposal made some time ago for the amalgamation of the two gas-works he said they had not achieved complete co-operation, but he was hopeful that after consideration and negotiations they might enter into some kind of undertaking of mutual advantage and to the common good of the people of both areas. Co-operation in such matters between local authorities was essential, particularly if they were as contiguous as Bangor and Newtownards.

INDUSTRIAL SAFETY

Over 600 safety officers, welfare officers, and executives, representing industry in all parts of the British Isles, attended the annual National Industrial Safety Conference, organised by the Royal Society for the Prevention of Accidents, at Scarborough during the week-end May 14 to 16.

The delegates assembled on the Friday evening and were accorded a civic welcome by the Mayor of Scarborough. Illness prevented the Society's President, Sir Charles Bartlett, from attending, but in his absence his address to the Conference was read by Mr. H. R. Payne, O.B.E., Chairman of the National Industrial Safety Committee.

The first paper was given by Sir George Earle. His theme was 'The Executive and Accident Prevention'. Sir George is Chairman of Associated Portland Cement Manufacturers, Ltd. He has spent 45 years in the cement industry and is the fourth generation in a line of cement makers. He is a Director of G. & T. Earle, Ltd., of British Portland Cement Manufacturers, Ltd., and of Associated Portland Cement Manufacturers, Ltd. He is Vice-President of the Institute of Directors.

Safe Use of Electricity

Saturday morning opened with a paper by Mr. S. J. Emerson, M.ENG., DIP.ENG., A.M.I.E.E., on the safe use of electricity. This speaker was followed by Mr. L. Bingham, who dealt with the legal duty of the employer to prevent injury to his workmen. Mr. Bingham is a solicitor who for 50 years has been engaged in dealing with the law relating to accidents of all the kinds which come within the purview of the insurance offices and the trade unions. 'Docks, Wharves, and Railway Sidings' was the title of a paper given on the Saturday afternoon by Mr. H. W. J. Bown, O.B.E., F.C.I.S., M.INST.T., General Manager of the River Wear Commissioners (the Port Authority at Sunderland). Also on Saturday afternoon Mr. H. Pirie, M.A., delivered a paper dealing with dangerous chemicals in common use in industry.

A paper dealing with flame failure devices on industrial gas equipment was given on the Sunday morning by Mr. R. C. Haslock, M.INST.F., who is the Group Industrial Engineer of the York-Harrogate Group of the North Eastern Gas Board.

A trade exhibition, at which were displayed many types of safety equipment and clothing, was held in conjunction with the conference.

Annual Accident Rate

In the course of his address as President, Sir Charles Bartlett said that accidents at work constituted so great a problem that the national conscience was periodically disturbed by their contemplation. The question arose, should the national effort be imposed by law, as was proposed in the Safety in Employment (Inspection and Safety Organisation) Bill recently before Parliament, or should responsibility for industrial safety remain in the hands of voluntarily established committees? Parliament decided that they preferred the second alternative, and the Bill did not become law.

'I think,' said Sir Charles Bartlett, 'that this was a wise decision; for the history of the voluntary accident prevention movement suggests that in this country — which traditionally dislikes regimentation—voluntary effort is more likely to succeed than a strictly statutory set-up, although the latter must be carried as far as is sensible and practical. So far the voluntary system has succeeded in reducing the number of accidents per 1,000 workers from 30 in 1927 to 22.5 in 1952. This is a reduction of 25%, and much of it can be attributed to the work of the voluntary safety committees. At present there are 3,225 joint management-worker committees; and, judging by the figures for the past five years, these committees are increasing at the rate of 130 per year.

'But,' he continued, 'at present the number of accidents in factories is in the region of 180,000 per year. There are 13,000 factories employing 50 or more people, so that the 3,000 odd committees only represent about one-quarter of the number required. From this it is plain to see that the field yet to be ploughed is much larger than the one so far brought under cultivation. Only with the active support of the employers can British industry be made safer and the number of accidents be reduced.'

The Importance of Enthusiasm

Throughout his paper Sir George Earle emphasised that industrial accidents could be reduced provided that there was enthusiasm for the effort. Without enthusiasm no plans or schemes would succeed. In his opinion the question facing all those who worked in the accident prevention field was how to get every man in a works keen on accident prevention. The lead, he said, must come from the top. 'If the head of a business is keen about accident prevention it is practically certain that everybody else will be enthusiastic too.'

Sir George quoted the old industrial adage, 'where there's muck there's money'. He felt sure that a truer saying would be 'where there's muck there's accidents'. He emphasised the importance of cleanliness and brightness in industrial premises as an aid to accident prevention. He wanted to forget the old days when accidents were looked upon as more or less part and parcel of industrial employment, and to create an atmosphere where an accident created as much alarm and excitement as when they got an outbreak of rabies in this country.

Incentive Through Competition

Competitions were urged by Sir George as valuable means of creating and maintaining interest in accident prevention. In his own Company safety competitions were organised between different sections in the works and between all the works in the firm. There were also competitions between all the works in the industry. He illustrated the successful results achieved by competitions by stating that in 1927 he had 23 works taking part in the competitions and the number of lost-time accidents in that year was 868. By 1953 there were 27 works in the competitions, but the number of accidents had dropped to 278

Sir George reminded his audience of the importance of seeking the help of the trades unions in the fight against works accidents, of which, he said, there were 155,000 in 1952. This, on a working week of 44 hours, meant there was just over one accident for every working minute of the year.

Mr. Emerson confined his paper to the ordinary type of apparatus with which a works engineer deals in his day-to-day duties, and not with the more complicated apparatus such as that found in power stations and sub-stations. He thought that the cause of electrical safety was done more good than harm by admitting at the outset that electricity, in common with other forms of power—*e.g.*, steam, water, gas, oil, etc.—could be very dangerous if reasonable precautions were not taken in its use.

There was, he said, a tendency in industry to take the dangers of electricity too lightly and each year a number of fatal and non-fatal accidents occurred which might well, with a little care, have been prevented. It was, however, true that many accidents were caused by the injured persons taking unnecessary risks or failing to utilise the means provided for their safety. Looking back over the post-war years, it was apparent that the failure of the individual, and not defective or irregular apparatus, was responsible for a great many accidents.

Treatment of Shock

When shock occurred the necessity for prompt and continued application of artificial respiration could not be over-emphasised. There were many instances on record where victims of electric shock had revived from apparent death after several hours' treatment.

Approximately two-thirds of the electrical fatalities occurred at voltages below 250, and of this number between 60% and 80% were associated with portable or transportable apparatus, and its associated connections. In 1951, faulty earthing was responsible for 79 reportable accidents, of which 13—all arising from portables—were fatal.

To reduce this list of accidents, tools should be regularly and frequently tested, particular attention being paid to the flexible cable and its connections and to the continuity of the earth conductor. To ensure that no individual tools were overlooked, it was important that such inspections and tests should be under control. A record should be kept in the form of a log-book or card-index.

The not uncommon makeshift arrangement of a portable lamp at ordinary A.C. lighting pressures consisting of a non-earthed brass lampholder with lamp connected to a pair of flexible cables had been responsible for more fatal accidents than any other single piece of apparatus.

The Legal Aspect

In his paper, Mr. L. Bingham, who has had a very wide experience of dealing with factory law, dealt briefly with the growth of factory legislation and pointed out that the law in the field of accident prevention now operated in three ways. The first was to prohibit the use of certain machinery, as in section 39 of the Factories Act, 1937; the second was to impose duties on the employer by statute, and a penalty for a breach of the duty; and the third, a somewhat more indirect way, to penalise an employer by awarding damages against him to an injured workman for Common Law negligence.

Mr. Bingham dealt individually with the requirements of certain sections of the Factories Act, and of Regulations made under the Act, and illustrated his points by quoting from a number of Court cases. He stressed the fact that an employer must know his obligations as laid down by statute, legislation, and Court decision—and not only know of their existence, but also learn what they meant.

Industrial Gas Equipment

Devices which guard against flame failure of gas and other fuel burning equipment due to any cause whatever are becoming more and more an integral part of such equipment, and are now being strongly advocated not only by the gas industry, but by the Factory Department of the Ministry of Labour. This is all to the good, providing the device installed is of the correct type, and is properly fitted.

Mr. Haslock explained that consideration must first be given to what are the hazards liable to occur should a gas flame fail without suitable flame failure protection. These can be easily defined as 'Explosion' and 'Poisoning'. Both these conditions affect human life in some way or another, and every care must be taken to obviate, whenever possible, such conditions arising. This can only be done by a satisfactorily designed and fitted protective system, of which flame-failure controls are a major part.

Mr. Haslock stated that to be satisfactory a flame failure device must entirely prevent gas from being supplied to the main burner until the pilot flame is established, be fitted correctly, be free from inherent weakness in design, fail to safety, after failure stop all gas flow and require manual resetting, be actuated only by a properly established pilot flame, and where it incorporates a gas-carrying component it must have an approved gas-carrying capacity within a permitted pressure loss. The speaker described a number of types of flame failure devices and illustrated his paper with lantern slides.

Mental and Moral Quality

In his remarks, Mr. Bown expressed his belief that the heart of the matter of accident prevention was the mental and moral quality of the management, the supervisors, and the workpeople. If those who composed the management were adequate in moral quality, they would ever have in mind that men mattered more than machines; and that men mattered more than money. If, allied with the moral quality, there was adequate mental quality, then the management would plan wisely, skilfully, and safely; and they would appoint supervisors who were like-minded. In turn, the supervisor on the job would never, in his enthusiasm for the work, lose sight of the human beings upon whom the work depended. Finally, the workpeople, knowing they were respected by those who directed the work, would respect themselves and one another; and there would grow among them a spirit of thoughtfulness instead of carelessness, cheerful alacrity instead of sluggish compliance, and a keen-eyed watchfulness instead of the dangerous inattentiveness which produced more accidents than any other single cause.

In his paper on 'Dangerous Chemicals' Mr. Pirie took selected examples from various groups of chemicals and used them to illustrate the safety precautions necessary when handling chemicals to avoid accidents. His examples included compressed gases, liquified gases, solvents, corrosive liquids, and solids.

The speaker summed up his paper by stating that the use of chemicals, including dangerous chemicals, was essential in industry, and, further, that their use would increase. But, he claimed, dangerous chemicals could be used in safety provided the proper precautions were taken.

'The main problem,' he concluded, 'was to know what precautions were necessary to ensure that everybody concerned was aware of them and that they were rigorously carried out.'

LONDON JUNIORS' ANNUAL MEETING

Officers Appointed for 1954-55

At the annual general meeting of the London and Southern Junior Gas Association at the North Thames Gas Board offices in Edgware Road on May 28, Mr. E. W. B. Dunning was elected President for the ensuing session. Other officers elected were: *Senior Vice-President*, Mr. N. R. Junkison; *Junior Vice-President*, Mr. J. B. McKean; *Hon. Treasurer*, Mr. D. G. Winslow; *Hon. Secretary*, Mr. J. D. Grant; *Hon. Assistant Secretary*, Mr. J. V. Rigg; *Hon. Transactions Secretary*, Mr. H. R. Cooke.

Members of the Council are: Messrs. J. E. Gray, R. K. Harrison, J. A. Nichols, C. H. Purkis, P. J. Savage, C. H. Townsend, N. T. Wait, and A. J. S. Wiseman.

The annual report and accounts were adopted. In presenting the financial statement, the Hon. Treasurer mentioned outstanding subcriptions. In the first few letters of the alphabet, he said, there was about £170 outstanding. He hoped that when the next financial statement was presented they would have a much more satisfactory state of affairs.

A resolution that the usual donation of 10 guineas be made to the I.G.E. Benevolent Fund was unanimously agreed to.

It was announced that Messrs. E. W. B. Dunning, N. R. Junkison, and A. H. Savill had accepted the Council's invitation to serve on the District Education Committee of the Institution of Gas Engineers.

The President, Mr. W. Johnson, announced the award of the Milbourne Prize to Dr. J. R. Dewhurst for his paper 'Uses of Coal Tar and its Products' and the S.B.G.I. Silver Medal to Mr. D. R. Wills for his paper 'Intermittent Space Heating'. A short paper by Mr. E. R. H. Rains had won the President's Prize.

A vote of thanks to the Technical Press was proposed by Mr. A. J. S. Wiseman and acknowledged by Mr. C. J. Godbold, 'GAS JOURNAL'.

Two short films were shown after the business meeting. They were provided by the Esso Petroleum Co. and entitled: 'Principle of Lubrication' and 'The Fawley Achievement'.

CARDIFF COOKERY CHALLENGE SHIELD

A perpetual challenge shield presented by the Cardiff undertaking of the Wales Gas Board is competed for annually by the secondary modern schools in the city. This year it was won by 14-years-old Patricia Tolley, of Gladstone Secondary Modern School—the second consecutive year in which Gladstone has won the trophy. This picture is of the finalists at the final ceremony on May 25.

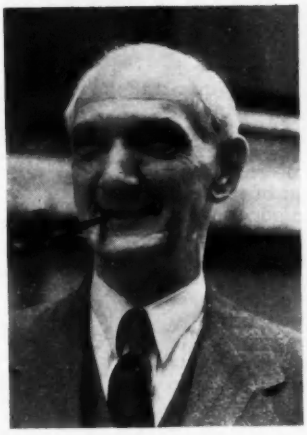
Institution of Gas Engineers

Education, Opportunity, Achievement

PRESIDENTIAL ADDRESS TO THE INSTITUTION OF GAS ENGINEERS DELIVERED AT THE 91ST ANNUAL MEETING AT BOURNEMOUTH ON MAY 31, BY

JOHN T. HAYNES,

M.I.C.E., M.Inst.Gas E., General Manager, Western Division, Southern Gas Board.



Progress to the office of President of the Institution of Gas Engineers—the highest honour which can be conferred by one's colleagues in the gas industry—is to some extent influenced by circumstances beyond one's control. As a pupil-apprentice over 45 years ago, I had no sense of being directed towards the Presidency of this Institution, but I have had the good fortune to serve under three eminent Past Presidents: Mr. Edward Allen, Mr. R. E. Gibson, and Mr. George Dixon. Each left his mark on the industry, and each taught me many useful lessons. Another old friend is Mr. Ernest Astbury, who as a works superintendent, had the duty of initiating me into the mysteries of gasworks management, and I am proud to acknowledge how much I owe to his friendly and able advice throughout the years. I feel that I must also acknowledge how much I owe to the practical help and support which I have always received from the numerous clerks, foremen, craftsmen, and gas workers of all grades with whom I have worked for so many years. I have counted many of them my personal friends.

Twelve months ago you were good enough to confer on me this great honour, and I must express once again my sincere appreciation and deep gratitude, and assure you that I have been very mindful of the responsibilities of the position. Remembering the many eminent engineers who have held this office before me, I entered upon my duties with pride and with humility. I now reach the end of my year equally proud, very happy, and with heartfelt gratitude.

During the year the outstanding event was the honour of representing the Institution at the Coronation of Her Majesty Queen Elizabeth II. I have also had the privilege of attending the annual meetings of four national gas associations of other countries, which in common with the Institution are members of the International Gas Union, and I have been represented at others by senior members of the Institution. In every case we have been thrilled by the warmth of the welcome extended to us. The Institution of Gas Engineers of Great Britain is held in the highest regard, and we can be proud to-day to welcome representatives of the gas industry from Europe and from our own British Commonwealth. The ready interchange of knowledge and experience which results from these visits must surely lead to greater usefulness and greater happiness throughout the world.

In common with most of my colleagues in the industry, I have been asked on many occasions during recent years what I thought of the nationalised gas industry. Each time I have recalled advice given to me by an old craftsman in one of the Liverpool Gas Company's works, on which I lived as a boy: 'Little children and old women should never see things half done; they must wait until the job is finished'. Being a child in such matters as nationalisation, I have hesitated to comment while the industry was passing through the transition stage from private enterprise to public ownership. We have now had five years of transition since vesting date, and the industry may at last be said to have settled down under the new organisation. It is therefore perhaps permissible to review some of the changes which have taken place, to consider some of the opportunities which the Gas Act, 1948, made available to us as technologists, and to measure the use we have made of those opportunities. That is the theme for this annual general meeting of the Institution. With the help of those who have prepared papers, I give some examples which, I feel, prove that as engineers and chemists we have justified our existence. Although there is little doubt that the views of our members, both individually and collectively, even those of junior members, do have a bearing on the determination of policy, it is not within the province of this Institution to discuss policy making in the industry. I shall, therefore, confine myself to those matters which come within the range of the day-to-day responsibilities of our members. It is gratifying to learn from the Chairman of the Gas Council that the changes which have taken place have been carried out so smoothly that the general public have been unaware of them.

The Status of the Gas Engineer

Probably, the first change that affected a large section of our members was in the status of the engineer and general manager. There were some 600 or more men holding this rank, and, whatever the size of the undertaking for which a man was responsible, he could meet his colleagues at meetings of this Institution and elsewhere on terms of equality, and, subject to ability and personality, a man's views and opinions carried equal weight with those of his colleagues. The exercise of his ingenuity and initiative was limited only by the views of his employers, whether company directors or municipal committees, who both knew him personally and were interested in the progress of the gas undertaking in a particular locality.

With the organisation set up by the 12 area boards, very few of those engineers and managers have retained the same measure of independence. Many have had their spheres of responsibility increased, others have been subordinated to geographically local colleagues, and all are now subject to global policies as determined by the area boards. There has been a feeling that in some respects the old independence has been lost. On the other hand, there are those who hold the view, and with good reason, that that very independence often militated against a constructive policy for the industry. The parochial outlook of many of the former managements, particularly of some of the smaller municipal undertakings, provided arguments for those who derided the industry, and it made things difficult for the more progressive authorities striving their utmost to raise the status of the industry in the minds of the Government and of the public. We have reason to be proud that, on the introduction of nationalisation, many of those who were most prominent in progressive thought in the industry were given positions of responsibility which have enabled them to exercise their talents far beyond the limits of their former localities; and there is no doubt that their influence has been for the good of the industry. At the same time, they will be the first to admit that their successes would have been impossible without the loyalty and support of those colleagues who have to some extent been deprived of their former independence.

Unfortunately there are still some in the industry who nurse grievances about their lost status and independence as engineers and managers of private undertakings, and who are more concerned with their rights than with their new opportunities. They fail to realise that without the initiative and drive of their more adaptable colleagues the gas industry would decline and they might soon lose not only their rights, but also their livelihood.

The Problem of Coal Supplies

Apart from the new conditions arising from the reorganisation of the gas industry, other factors are setting problems for the engineers and chemists. The dwindling supplies of suitable coking coals, and the increasing necessity for the export of such supplies as are available, make it necessary for us to devise new methods of producing gas from coals of lower coking quality. The increase in the refining of crude oil in the country is not only providing products which are even more valuable than coal as exports, but it is also tending to flood the home market with both heavy oil and liquid petroleum gases in competition with town gas. There would, therefore, appear to be very urgent reasons for the development of methods for the production of town gas from these products. The purpose of engineers is to utilise the resources of nature for the benefit of their fellow men. The members of the Institution of Gas Engineers have already solved some of these problems, and have put their ideas into practice with great advantage to the nation. Opportunities for the exercise of ingenuity are greater now than ever before in the history of the industry, and we are entitled to derive some satisfaction from the progress which has been made.

Prior to nationalisation, current legislation made it difficult for enterprising managements to effect extension of boundaries in order to achieve the economies possible by larger organisation—such as more expert administration, interlinking of production units, and improved service to consumers. From the earliest days of the industry, some local mergers have taken place and neighbouring units have been absorbed. More recently, the holding company organisation was introduced to the industry; but all this development was dependent on special legislation and was hindered by opposition which could be overcome only by heavy financial compensation. The Gas Act, 1948, swept away all these difficulties, and, whatever may be one's political views, it must be admitted that the Gas Act gave to the industry opportunities for which we have been longing since the beginning of the century. Although there was some hesitation five years ago to acknowledge these opportunities, the gas industry is now working in a way which is not only the envy of many in the other nationalised industries, but which has the approbation of both its political sponsors and of their opponents.

Much of the credit for this state of affairs is due to the members of this Institution, and we have reason to be proud of our profession as Chartered Gas Engineers. We can rightly claim that we have recognised opportunities and that we have made the utmost use of them. Our efforts have been hampered by national economics—restrictions on capital expenditure, reduced availability of gas coals, shortages of steel, purchase tax, etc.; but, in spite of these limitations, or because of them, the gas industry today is stronger, more virile, and has a greater sense of direction than it ever had before.

The Condition of Rural Undertakings

After the first shock of nationalisation, one of our first realisations was the appalling condition of some of the small rural undertakings. We had known that they lagged behind the larger undertakings in efficiency and service, but we excused them because of their lack of financial resources. Curiously enough, management by holding companies in some cases failed to make much improvement, therefore it would seem that finance was not the whole answer to the problem. Now, after five years of nationalisation, the rural areas have a better service of gas, more consistent in quality and pressure regulation, a better sales and service organisation than ever before, and in some cases a lower price of gas in spite of the crippling increases in the cost of coal.

The consumer knows little or nothing of technical efficiency, but he does appreciate good service and low price. The advantages he now enjoys are the result of the recognition by the gas engineer of the facilities made available by the reorganisation of the industry, and also of the guidance of those of our members who have been entrusted with high responsibility by area boards. Money has been spent on the reconditioning of old and worn-out plant, on the provision of mobile laboratories with expert technical staff, on the payment of standard rates of wages, on improved conditions of service, and in many cases on the provision of bulk supplies from larger undertakings by integration. Five years is a short time in the progress of an industry, but already we can be proud of our achievements under the Gas Act of 1948.

During the last 50 years there grew up an idea that the maximum efficiency of a gas undertaking could be achieved only on a works of a certain size, and that larger undertakings were but a multiplication of that most efficient size without any appreciable increase in efficiency being possible. There is still some truth in that idea, but the grouping of many undertakings into an area board has enabled the industry to integrate adjacent medium-sized undertakings so as to form a smaller number of large units, each capable of even higher efficiencies than was previously thought possible. Progress along these lines has unfortunately been slower than we could have wished. The high cost of plant, the difficulties of obtaining the necessary materials, and the overburdening of contractors' order books have prevented us from doing all that we should have liked to do; but already the higher efficiencies resulting from the work which has been completed has enabled area boards to keep gas prices much below those which would have been justified by the tremendous increases in the costs of coal, wages, transport, and materials.

Many improvements of a chemical and engineering nature have been made in the design, construction and operation of gas-producing plant. It can be argued that all of these could have been effected and almost certainly would have been made without nationalisation. They may not have resulted from our new opportunities, but there is no doubt that their adoption on a great number of large-scale installations would not have progressed so rapidly if the industry had continued as a number of separate and unco-ordinated units each concerned only with parochial responsibilities.

The Field of Gas Distribution

It is perhaps in the field of gas distribution that our opportunities have had the greatest effect on our members. Integration of adjacent undertakings has enabled the design and production engineer to develop his highest technical efficiency, but to the distribution engineer it has meant the raising of his importance in the industry equal to, if not superior to that of, the production engineer. Until recently, many hardly dared to call themselves engineers. They could be distribution superintendents, but rarely were they called distribution engineers. They were engineers, they had to qualify as such by examination for membership of this Institution, and they achieved educational and training standards equal to those of their colleagues engaged in gas manufacture. But rarely was a distribution superintendent promoted to be an engineer and manager. At last, they are of equal importance: and how thoroughly they have justified their new status! They have planned for the area boards a series of gas grids requiring scientific and engineering knowledge comparable to that used in the more popular electricity grids. They have initiated ideas based on knowledge acquired from other industries and other countries. They transmit gas at high pressures over long distances and many areas are now supplied with gas in bulk with great economic advantages. Distribution engineers have also become more cost-conscious, and the relative advantages of various schemes of integration compared with the cost of producing gas at small and scattered centres is now an everyday problem.

(*Continued on p. 627*)

Production of town gas by complete gasification of coal

(GAS INTEGRALE SYSTEM)

	Naples	2 units
	Rome	4 units
	Trieste	2 units
	Milan	2 units
★	La Spezia	1 unit
	Como	1 unit
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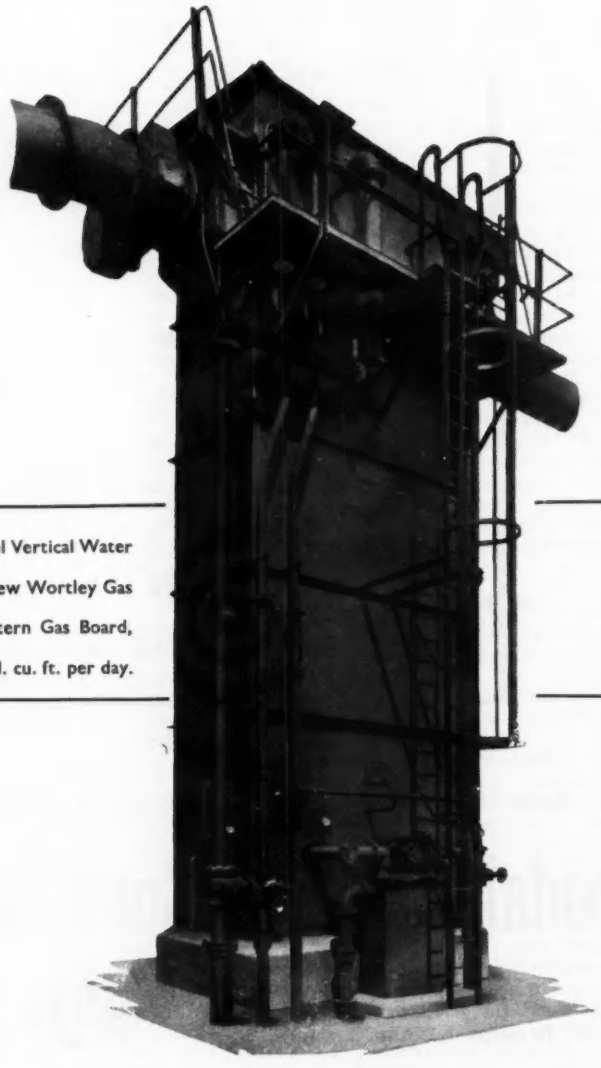
One of our recent developments is the Labyrinth type Condenser which is especially suitable for large capacities and embodies the inherent advantages of both horizontal and vertical types :-
Reduced cooling surface, Increased rate of heat transfer, Accessible tubes, High water velocity



Illustrated is one of three Mild Steel Vertical Water Tube Condensers installed at New Wortley Gas Works, Leeds, for the North Eastern Gas Board, each having a capacity of 3 mill. cu. ft. per day.

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The gas industry has long recognised the need for active consultation with industrialists on the efficient use of fuel. Several of the large undertakings had established industrial gas laboratories prior to 1949, and there was a voluntary interchange of information. Five years ago, these laboratories vested in their respective area boards, and more recently there has been a co-ordination of their activities directed by the Gas Council. Integration of gas undertakings and a wider utilisation of coke oven gas from outside sources has enabled the industry to meet increasing demands for gas and to intensify its drive for the use of gaseous fuels for still more varied industrial purposes. Here again, the engineers and chemists of this Institution have exerted themselves under the new directional drive to overcome by increased efficiency the severe competition of other fuels. Or is it that gas is the competitor crashing into a market traditionally held by coal?

Co-ordination of Research

Many years ago, this Institution was responsible for co-ordinating the scattered and isolated efforts to conduct research by certain large gas undertakings, and by progressive firms of contractors. It was largely responsible for the formation of the Gas Research Board, in 1939, and for the conduct of more fundamental research, in co-operation with the University of Leeds. Unfortunately, the outbreak of war diverted the attention of the sponsors and limited the activities of the Gas Research Board. After the war, there was a natural tendency for the urgency of scientific investigation into day-to-day technical problems to take precedence over long-term research for the industry, and the voluntary nature of the Gas Research Board tended to militate against any strong directional drive. The Gas Act of 1948 provided an opportunity for the industry, as represented by the newly appointed Gas Council, to reconstitute the research organisation: and the former Gas Research Board was disbanded. There was ample evidence at the 19th Autumn Research Meeting of this Institution, last November, that in this direction, also, the industry is making full use of its opportunities, and the prospects ahead are such as to arouse enthusiasm in all young scientists fortunate enough to gain admission to the industry.

The voluntary organisations which grew up for the co-ordination of the gas industry date back to the early part of the century. One of the most successful of them was the Federation of Gas Employers, which kept the industry remarkably free from the labour troubles which interfered with production in other industries. The functions of the Federation of Gas Employers are now known as industrial relations, or, as I prefer to call it, the human factor in industry. This is a subject which ought to be in the curriculum of every centre of technical education. At an early stage in the training of an engineer, the young man is put in charge of one or two men, and from then onwards his responsibilities for the handling of labour increase. A gas board cannot allow a junior member of its staff to make mistakes with the trades unions. It is, therefore, just as essential for the young man to be trained in the proper use of human materials as it is to learn the proper use of constructional materials by a study of such subjects as 'the strength of materials,' and the 'theory of structures.' Admittedly, some men are by nature more gifted than others for getting the best out of their fellows, just as some are natural musicians or artists: but all are the better for training, and much of the dissatisfaction and friction in industry generally could have been avoided by suitable education instead of by hoping that an embryo manager would 'learn by experience.'

The Tradition of Loyalty

The nationalised gas industry inherited a wealth of loyalty greater, I think, than exists in any other industry in this country. That loyalty must be fostered at workshop level by personal example and interest. Area welfare officers and similar officials can only co-ordinate and direct local efforts on the right lines. Not even elected consultative committees meeting periodically round a table can take the place of the personal sympathy and understanding which exists between a loyal workman and a respected superintendent.

Education is one of the objects of the Institution. We must, however, beware of the fault of overstressing the materialistic necessities to the detriment of the human factor. May I quote from an American professor: 'Though I speak with the authority of directives and have no respect for persons I am as sounding brass or a tinkling cymbal. Though I have the gift of organisation and understand all technical processes, and though I am ingenious enough to eliminate all bottlenecks, and have no respect for persons, production will lag. And though I maintain wage scales above my competitors and install the most elaborate personnel procedures and have no respect for persons it profiteth me nothing'.

At the risk of being accused of overburdening the Institution's Education and Training Scheme, I would plead for the inclusion of still one more compulsory subject—Costing. At an early stage in his training, the engineering or chemical student learns to appreciate the comparison of technical results, but later on he has to learn the interpretation of those results in terms of money. It is his ignorance of this interpretation that makes him so dependent on, and sometimes resentful of, the accountancy profession. It is not suggested that every engineer should be an accountant, but much of the feeling expressed from time to time could be avoided if engineers were trained to be cost conscious. It would enable them the more readily to place the right value on operations and processes, and it would help them to appreciate the usefulness of accountancy as a tool of management—just as engineering and chemistry themselves are but tools of management

Last year the Institution recognised the necessity for an intensive course in management, and we are indebted to Mr. J. H. Dyde and Mr. A. G. Higgins for the arrangements made for such a course at the Brooklands Technical College. The industry owes a debt of gratitude to the Woodall-Duckham Company for providing the necessary funds for the course, to the Chairman of the Gas Council for the ready and practical support the Council gave to the proposals, to the Principal and staff of the Brooklands College for their co-operation, and to the eminent persons who gave up time to lecture to the students. We are glad to know that a similar course has been arranged this year and is now nearing completion. It is doubtful if such a far-sighted scheme would have been both possible and so successfully organised but for the opportunities provided by the Gas Act, 1948.

A Spur to Further Effort

I have dealt at some length with the use which has been made of the opportunities made available to the gas industry and more particularly to the members of this Institution by the Gas Act. We have reason to be gratified and proud. The reaching of the summit of Mount Everest, however, is not achieved by the fluttering of flags on the headquarters of the Royal Geographical Society. Our successes so far must be considered as a spur urging us on to still more spectacular successes. Our chemists must solve the problems of still more efficient production of gas in existing plants from the coals available. They must find new and even more efficient ways of treating wide ranges of coals not normally used for gas-making. They must develop alternative methods of producing town gas from heavy residual oils in order that there may be lively and healthy competition. Our engineers must construct and operate plants which can implement the discoveries of the chemists. They must concentrate on the most effective way of distributing the gases so produced, and take measures to improve the load factor on existing distribution systems in order to bring down costs. They must ensure that the efficiency of utilisation of gas and of its by-products is increased to such an extent that the whole industry can say, like the pork butcher, that the only thing it cannot usefully employ is the 'squeak'. Engineers, chemists, and salesmen must combine still more closely to ensure that town gas is used for all those purposes, domestic, commercial, and industrial, in which solid or liquid fuels have to be gasified *in situ* before they can produce heat. Our members must be trained in cost-mindedness, and in human relationships, the better to qualify them for managerial posts at all levels.

The gas industry has a capital of £304 mill. It is much larger than Imperial Chemical Industries, Unilever, General Electric Company, or any of the aircraft industries. The opportunities for young men entering the gas industry were never so great, and we older ones can be almost envious of those who are now starting with such opportunities ahead of them.

The field of engineering knowledge is so wide that it requires not only the whole of an engineer's working time, but many of his leisure hours also. The increasing extent to which the work of a gas engineer affects almost every aspect of the life of the community requires that he should increase his knowledge of culture and art so that he can feel 'at home' among those who hold administrative posts. The readiness of an engineer to get on with his own job and to leave to others the less arduous task of talking about it is understandable, but it should not be used as an excuse to exclude him from the administrative side of affairs. It must be admitted that the technical and scientific information of which the young engineer has to obtain a working knowledge is now so varied and extensive that one hesitates to suggest that he should add to this a determination to acquire more 'general' knowledge, but if he fails to do so he cannot expect to progress very far towards administrative success.

Grounds for Confidence

As President of the Institution, I have visited all the Sections of the Institution and all but one of the Junior Gas Associations. The outstanding impression I have obtained is that the high quality of the young men who are coming forward inspires a healthy confidence in the future of the industry. Good engineers live and thrive on the success of their ingenuity and inventiveness. The morale of the many excellent men, both young and old, in the gas industry will be lowered if their initiative is unduly restricted, and I would urge the gas boards to allow a very considerable degree of freedom to the rising generation and not to bind them too tightly to rules of procedure. In this connection, I am of the opinion that the present tendency to introduce functionalism throughout the gas industry requires specialists in the various branches. Specialisation leads to a restricted outlook. High-level management demands experience and the ability to co-ordinate the activities of others; and these qualities are most likely to be developed in those young men who receive training in all branches of the industry—general practitioner rather than the specialist. Any impression that the work of a gas engineer is lessening in interest and opportunity is wrong, and there must be no room for doubt that gas engineering is very attractive as a permanent career. Schoolboys cannot be expected to appreciate this, but their parents will; and the industry must do all in its power to quicken the interest of those responsible for guiding youth to a fuller and a happier life.

I cannot conclude this address without a grateful acknowledgment of the generous understanding and kindly support which I have received from the Chairman of the Southern Gas Board, Mr. McBain, and his colleagues. I can assure them that my many absences from Bournemouth have not resulted in any reduction in efficiency in the Western Division of the Board. In fact, it is even higher now than ever before, thanks to the ready response by every member of my staff to the extra calls which I have made upon them. The Institution staff also, under the direction of Dr. W. T. K. Braunholtz, have been a tower of strength, and I tender to you all my heartfelt thanks for all that has been done to ease the burden of the President of this Institution, and to make the office so enjoyable.

Pride in and loyalty to the profession were always outstanding characteristics of the gas industry. To-day this Institution has greater cause than ever before to expect its members to be proud to be called Chartered Gas Engineers.

NEED FOR NEW CLEAN AIR LAW

The National Smoke Abatement Society has published, as a printed booklet, a memorandum of proposals for action that it has submitted to the Government Committee on air pollution (the Beaver Committee). Injury to health, heavy economic costs, and wastage of fuel are the three main consequences of air pollution, and, says the Society, any one of these taken entirely alone would fully justify their proposals.

'Taken together, the case for prompt, urgent and high-priority action on the lines proposed is unquestionable,' and the cost 'would not be likely to be more than a fraction of the annual cost of continuing to fail to take action.' The Society's proposals fall into two parts: action that can be started at once, and a completely new clean air law.

Out with the Old

The present law is called 'stable door' control because it only operates after a nuisance has been committed. It has scarcely changed at all during the past 75 years and needs so much amendment that in the opinion of the Society it should be repealed in its entirety and replaced by new.

Provisions that the Society would like to see in the new law include: More stringent control methods for checking any smoke that may be emitted; prior approval of all new fuel-burning installations (except domestic, for which only approved appliances should be sold); ability of local authorities to set up smokeless zones without having to promote private Bills. And, to ensure that the new law is used, it is urged that it should be obligatory for all local authorities to employ qualified smoke inspectors, or alternatively to join together as Joint Air Pollution Control Committees to do so. If neither course is taken then the county council should take over.

The law should require all boiler and furnace firemen to possess a certificate of proficiency.

Immediate Action

Progress towards smoke prevention can be started at once, and the Society outlines steps that should be taken by the Government, the local authorities, industry and the trade unions.

It is what the central Government can do that receives most attention, including the need to make smoke prevention one of the top factors in all fuel policy questions which affect it; the implementation of what the Ridley Committee and the Fuel Conservation team of the British Productivity Council have already proposed; the development of smokeless fuels production and more of these fuels to be switched to domestic use, especially in the 'black spots'; more research on outstanding problems; encouragement of local authorities; and the setting up of a standing Government organisation or committee to keep the problem under continuous review.

It is said that the central Government has 'frequently failed to encourage or facilitate proposals by local authorities,' and it 'should not only be more ready to approve initiative by local authorities but should in fact stimulate it.'

Fully Qualified Inspectors

Local authorities are urged to make full use of their existing powers to abate smoke and should employ fully qualified inspectors. They should directly encourage the use of smokeless methods and should include smoke prevention as part of their statutory health education propaganda.

The Society is emphatic about the need for all the responsible bodies to help in the work of public education. The proposals made, it is pointed out, are largely dependent on public opinion and public demand. 'Without such approval and even pressure, both popular and among those directly responsible for taking or initiating action, such proposals will continue to remain unfulfilled.'

The memorandum reminds the Committee that the previous Government Committee (in 1920) concluded that 'no Government has, for many years, taken any action with the exception of appointing committees, whose labours have had little or no result.' The first step in creating the public opinion necessary to prevent this happening again, it is suggested, can be the Beaver Committee's own report, which 'should make a sharp and compelling impact in responsible quarters.' Copies of the 16 pp. memorandum may be obtained from the National Smoke Abatement Society, 30, Grosvenor Place, London, S.W.1, at 1s. per copy.

USE OF GAS IN SUGAR CONFECTIONERY

FROM A PAPER TO THE LONDON AND SOUTHERN JUNIOR GAS ASSOCIATION ON MAY 7, 1954, BY

H. CAPPER,

A.M.Inst.F., M.I.S.I., L.I.M., West Surrey Division, South Eastern Gas Board.

The enthusiasm with which the general public seized upon the derationing of sweets has set a considerable problem for the manufacturers and given a great opportunity to the gas industry. One of the effects of rationing of sweets was that millions of adults took their rations and learnt once again to appreciate sweets; and this, combined with the changed attitude of the present generation towards children and their place in the family budget, has led to a tremendous increase in the demand for sugar sweets.

The need to increase the manufacture of sugar confectionery for home consumption and for export, will necessitate improved production methods, machinery and factory equipment, and the better utilisation of fuel in one form or another. Already many sugar confectionery manufacturers prefer and use gas, and it is the duty of the gas industry to ensure that gas obtains the load.

It is estimated that the consumption of sugar in Great Britain, now that rationing has ended, exceeds 1,346,000 tons per annum. In 1952 some 160,000 tons were used in sugar confectionery and the manufacture of chocolate. Prior to the war 296,000 tons were used for the same purpose. There is a considerable leeway to make-up, which, together with the increased requirements of the public, constitute a large potential load that should be of great interest to the gas industry.

Since sweet rationing ceased, the South Eastern Gas Board has supplied over 60 30 lb. sugar boilers to various confectioners. If we take a figure of 90 cu. ft. of gas for each boiling of sugar, and allow 40 boils per week, this would represent an added gas consumption of 54,000 therms per annum. In many cases these boilers are used to a much greater extent than I have taken as the basis for my estimate.

Sugar Boiling

Refined sugar, when boiled beyond the 'degree of ball' (250°F or 121°C), will grain or candy after pouring or agitation, and will ultimately set to a hard, opaque solid. To prevent this candying, which means that the sugar is assuming a crystalline condition, one of two substances is generally used, glucose or cream of tartar. Strictly speaking, neither of these actually prevents the sugar from graining, but the amount introduced will have such an effect on the syrup that the grain will not become apparent for some time, probably months or even years.

The proportion of glucose commonly used is 4 lb. to every 12 lb. of sugar, but this may vary between 2 lb. and 12 lb., depending upon the other ingredients used, the type of plant, length of shelf life anticipated, and climatic conditions. Cream of tartar is equally effective, and is preferred by some confectioners as producing a sweeter article. The chief advantage of cream of tartar is that the product, particularly with high boilings, is drier and more brittle, whereas a similar boil with glucose is inclined to be tough. The disadvantage of cream of tartar is that more prolonged cooking is necessary to achieve the desired result. Time and temperature are difficult to control on open boilers, making the production of a uniform line uncertain, and in the case of high boiling the long cook at a relatively high temperature results in discoloration and deterioration of flavour. With high-speed boiling the use of cream of tartar is virtually impossible owing to the short cooking time involved. It is normal to take a cream of tartar boil a few degrees higher than a glucose one.

The usual method of manufacture is to place a weighed amount of sugar and water into a copper pan which is placed on a gas-fired sugar boiler. At first only a gentle heat is applied until the sugar is completely dissolved in the water. At this stage glucose is added, the whole mixture stirred, and brought rapidly to the boil. It is important that the sugar should be properly dissolved into the liquid, otherwise it tends to adhere to the sides of the pan. The confectioner takes the precaution to ensure against this in some cases by steaming or washing-down the sides of the pans. When the desired temperature for the syrup is reached the gas is turned off and the pan removed from the stove.

A standard low-pressure gas-fired sugar boiling pan used for general utility purposes consists of a cylindrical casting constructed of self-colour mild-steel sheet welded to a mild-steel plate base. The casing is lined with insulating firebrick taken to within ¼ in. of the top ring, leaving a space through which flue gases are admitted to a horizontal annular channel leading to a spigot flue outlet.

Burner Equipment

The aerated burner unit consists of an eight-arm star-type cast-iron burner head and 2-in. short horizontal mild-steel mixing tube carrying a 2-in. cast-iron injector with a ¼-in. connection. A permanent pilot burner is fitted to the boiler. Gas consumption, hourly, is 199 cu.ft. A temperature rise of 144°F. can be obtained from this boiler for a consumption of 56.5 cu.ft., with a weight of 50 lb. This is generally suitable for temperatures up to approximately 270°F.

The quality of the product required determines the temperature to which the sugar is to be heated, and the following table shows the standard range of temperatures used in sugar confectionery.

TABLE 1.

Temperature	Term	Test	Use
230°-235°F.	Thread ..	—	Liqueurs, crystallising syrup.
240°-245°F.	Feather or soft ball	Plastic and workable with fingers.	Fondant cream.
250°-255°F.	Ball		Candies, fudge.
260°-265°F.	Hard ball ..	The ball formed will become harder as the temperature rises.	Caramels.
265°-270°F.	Stiff ball ..		Toffees, caramels.
270°-280°F.	Low crack ..	The boil should leave the rod clean when pulled off.	Nougat, toffees.

The hot batch after removal from the gas-heated sugar boiler is poured on to a cast-iron table which may be gas or steam heated. The gas-heated plate is essentially a cast-iron top plate resting in an angular frame with three rows of bar burners underneath, each row being separately controlled by a cock. The gas consumption varies depending upon the length, width, and temperature required.

The raw materials used in the manufacture of sugar confectionery are nuts, sugar, glucose essences, colouring, etc. The storage of these ingredients does not call for any special treatment other than that sugar should be kept dry, with the exception that glucose provides a useful gas load in that it must be stored at relatively high temperatures. Glucose arrives at a factory in bulk, the glucose having been filled into tankers at the refinery at a temperature of 150°F., so that when it arrives at the factory it is still warm and fluid. From the tanker it is pumped into a heated storage tank and maintained by thermostatic heaters at a temperature between 100°F. and 120°F. At the refinery the temperature is maintained by hot water coils which are placed inside the large and efficiently insulated horizontal boilers. The hot water is provided by an installation consisting of two No. 1 Series Potterton 'Rex' six-section gas-fired boilers, shown in Fig. 1.

The whole installation is completely automatic, the temperature being regulated by thermostats fitted into the main flow pipes. The maximum gas consumption of the two boilers is 1,000 cu.ft. per hour, and the annual consumption approximately 16,000 therms.

I have described the installation of glucose storage at a refinery. There are, however, examples where a similar installation on a smaller scale is maintained at the factory. In one case gas is used for heating only in the glucose room after normal working hours when the steam boiler

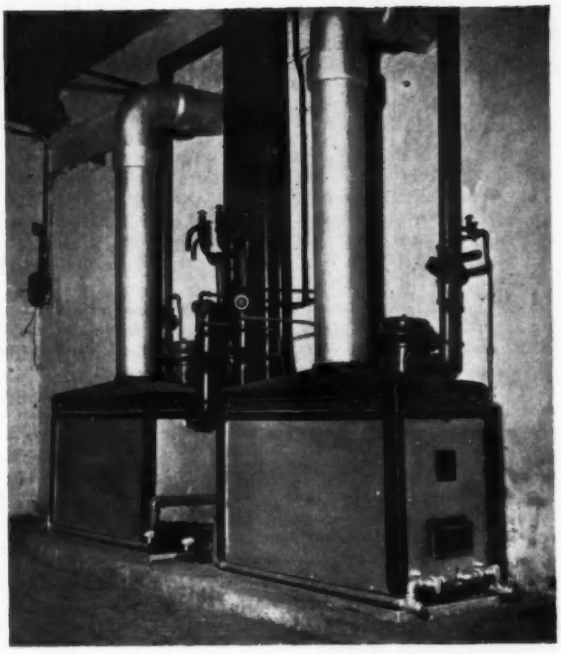

Fig. 1.

feeding the works has been closed down. In this installation two 10-ton glucose tanks are maintained at a temperature of 90°F., by gas during the night and at week-ends, and then heated up to 110°F. by steam when required. Controlled inlet and outlet air grilles are fitted in the room. There are in this instance two gas-fired unit heaters at low level, with a gas consumption of one-third therm each, and a heat output of 33,000 B.Th.U. A third unit heater is installed at high level, with a gas consumption of one-fifth therm and a heat output of 20,000 B.Th.U. Each heater is thermostatically controlled, and the required temperature of the room is effectively maintained.

Chocolate Work

It is not intended in this paper to deal with the manufacture of chocolate on a large scale. This requires a large factory with expensive machinery and is a very specialised branch of the industry. It may be of interest, however, to give a brief outline of the processing and the use made of gas.

In the first place, the roasting of the fermented cocoa bean requires much skill and experience. The different varieties of cocoa beans vary enormously in aroma, strength of flavour, and colour. The colour can be darkened by higher roasting and treatment with alkali. Roasting also brings out the flavour, and the blending determines the degree of acidity, bitterness, or blandness. The selected beans are sieved to free them from any foreign matter and are then roasted in a revolving drum rather like a coffee roaster, heated either by direct gas-firing or by heated air. The temperature for the roasting is approximately (275°F.). From the roaster, after rapid cooling, the beans pass to a machine where they are kibbled to break the bean and to separate the germ, and then on to a winnowing machine for the separation of the husk. The resulting nibs are now ready for blending and grinding, usually by granite rollers. The actual milling continues until the desired degree of fineness is obtained and then the liquid chocolate mass is run off into a melangeur. Here the fine powdered sugar and other ingredients are added and the whole thoroughly blended, refined, and further processed according to the quality of product it is desired to produce.

Unless the confectioner makes his own chocolate, he will receive the couverture in block form from the manufacturer. The block must be melted before it can be used for covering centres; and owing to the particular nature of the material it needs very special treatment in this respect. Chocolate is a suspension of solids in cocoa-butter. It must be remembered, however, that cocoa-butter is itself a mixture of glycerides of fatty acids each of which has a different melting temperature, so that, to liquefy the whole, it is necessary to raise the temperature of the mass above that required to liquefy the glyceride with the highest melting point. If the liquid is allowed to cool, the component with the highest melting point will solidify first and so on until the whole has been crystallised. If this process is allowed to take place undisturbed, the various constituents will separate into layers, a condition which is undesirable. For this reason chocolate couverture is 'tempered' before it is used as a dipping medium.

For tempering the chocolate a melting tank or kettle is used. This should be fitted with a thermometer and thermostatic control. The temperature of the mass should not be allowed to rise above 115°—120°F. for plain chocolate or 110°F. for milk chocolate. After heating the batch uniformly to 115°F. it should be slowly cooled to 82°F. Having lowered the temperature of the mass it is gently heated to the working temperature, varying between 86°F. for hand dipping, 88°F. for fork dipping, and 89°F. for machine enrobing. The temperature of the room in which the hand dipping is carried out should be maintained between 65°F. and 68°F. If the temperature is above 70°F. processing becomes difficult. The air should be free from steam, dust, and cold draughts. A gas-fired centrally heated plant is the answer to the problem of maintaining this dipping room at the correct temperature.

A bath designed by the North Thames Gas Board is made of copper heavily tinned on the inside, with a copper water jacket and chromium plated copper casing. It is heated by a bar burner controlled by a thermostat in the water jacket, which maintains the chocolate in the bath at 115°F. The bath holds 21 lb. of chocolate and the gas rate for maintenance is only 3.5 cu. ft. per hour. The maximum gas rate is 10 cu. ft. per hour.

The temperature in the packing room should be between 65°F. and 68°F. and the atmosphere must be dry. Here again, gas can very well satisfy these requirements. Little air movement is desirable in this room, so that air heaters are not suitable. Either radiant heating or central heating is the answer. Temperature during storage is important; the optimum is 60°F. to 65°F. Temperatures above 75°F. are distinctly injurious, as are excessive fluctuations and extreme conditions of sunlight and dampness.

Soft Centre Plastic Sweets

The manufacture of soft centre sweets requires a variety of centres, the preparation of which calls for special skill and techniques. The centres are made in a number of steam-heated jacketed mixing pans. While the manufacture of centres is under way the boiled sugar is being prepared in gas-heated sugar boiling pans. When a temperature of 320°F. is reached and the water evaporated and the concentration of syrup for sweet manufacture has been achieved, the sugar is run-off into weighed quantities. These quantities are then poured on to a cast iron table. When the batch has reached the required temperature and consistency which enables it to be worked by hand, the necessary amount of colouring is added and the mass folded a number of times until completely mixed. The sugar slab is then put into a batch roller, and by means of its centrally tapered roller and two outer tapered rollers the sugar mass is pulled out into a long thin strip known as the 'rope'. The soft centres, such as fruit, are pumped into the sugar mass while passing through a gas-heated batch roller, the gas consumption of which is approximately 60 cu. ft. per hour.

The 'rope' is then passed to a continuous soft-centre plastic machine. It passes between heated wheels which compress it to the required thickness, then between embossing dies which make the 'rope' into a continuous strip of sweets. Gas is used to keep the transporter tray and the sizing wheels heated to the correct temperature. The gas consumption is 60 cu. ft. per hour, the apparatus being only occasionally in use, to take off the chill.

Gas in the Starch Room

The starch powder used for the moulding of sweets and jellies is usually ground maize from which only the germ has been removed. It should be free from any odour or unpleasant taste. In the condition as received it will absorb moisture readily up to 14%, whereas for the purpose required it is desirable that it should be as dry as possible. It is therefore usual before using the maize to dry the starch artificially either in a drying room or specially designed gas oven, where the powder is spread out in thin layers on trays and exposed to a relatively high temperature for a short time. This overheat is, in effect, a form of sterilisation.

If the dried starch is maintained at a temperature of 90°F. it retains desirable properties for a much longer time, and it is usual for special drying rooms to be provided which can be maintained at this temperature. The heating of the drying room must be as even as possible and the room freely ventilated. For some types of goods the condition of the starch powder is so important that it is well worth while installing gas-fired thermostatically controlled ovens so that the different temperature ranges can be maintained as and when required.

Most of the goods prepared in the starch room require to be crystallised. The crystals of sugar deposited on the surface form a crust which prevents evaporation and consequently drying out of the confection. The process is very simple, but it requires extreme care and attention. The ultimate success of the method depends on the correct preparation and strength of the syrup. The success of crystallising syrup depends on using a gentle heat, preferably in a steam pan or low-pressure gas-heated boiler.

The gas-heated boiler is popular among confectioners, and a good number have been installed in my own Division, where gentle heating and slower boils are required. The boiler is constructed for heavy duty, and maintenance costs are exceedingly low. The burner is of the low-pressure aerated type and has an hourly gas consumption of 245 cu. ft. A boil of 40 lb. can be heated to 217°F. in 17 min. if required.

It is advisable to steam or wash-down the sides of the pan, for one small crystal left in the syrup will be sufficient to cause premature crystal formation in the supersaturated solution which will render it useless for the purpose. The syrup is brought to a boiling range of 217°F.—219°F. as quickly as possible and cooled equally quickly, as the inversion of sucrose takes place at temperatures above 160°F. The syrup is allowed to cool undisturbed to room temperature, which should be between 70°F. and 75°F. The confectionery is placed in the tins, the syrup gently poured over, and left undisturbed for 6—16 hours, after which time a uniform coating of sugar crystals should have been formed.

The self-generating steam pan is used in all varieties of confectionery, particularly where a gently heated temperature is desired in the initial stage of process and increased speed of boiling as and when required. The unit consists of a gas-air heated furnace and self-generating steam pan. The speed of heating can be increased or decreased as necessary and the maximum gas consumption is approximately 250 cu. ft. per hour. A stirrer or beater can be fitted to the unit if required.

With cased rock, the sugar, glucose, and water are taken up to a temperature of 305°F. as quickly as possible, as is the case with clear mints and some nougats and toffees. The type of cooker usually employed is the 30 lb. capacity sugar boiler which operates off low-pressure gas and fan air; and, generally speaking, a 30 lb. boil can be got off in less than 20 min., with a gas rate of approximately 90 cu. ft. per boil.

Fig. 2 shows a batch of sugar boilers by Radiant Heating, Ltd., ready for despatch to a large sweet manufacturing company. This type of boiler has been found to be very successful where clear sweets are required, because it gives a very high rate of heating.

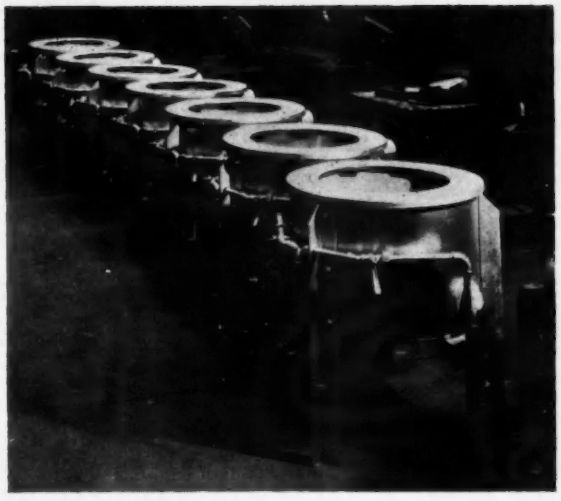

Fig. 2.

The latest type of cooker for continuous and mass production of candy is the new Baker Perkins microfilm patent automatic continuous sugar cooker which embodies the ideal of instantaneous cooking in an atmospheric pressure machine. It is the result of many years painstaking research and experiment. The cooking unit and syrup tank are both steam-heated with a normal working steam pressure of 120 lb. per sq. in. A gas-fired steam boiler with an hourly steam evaporation of 349 lb. is ideal for this machine.

Bottle Washing and Drying

On reaching the factory the glass jars pass from a store to receive various treatments. Some are sterilised, washed, dried, and cooled by the use of steam, while others may be sterilised, hand washed, and dried by gas-heated air, depending on the required output. Whichever operation is used gas is the fuel to supply the heat requirements.

The British Miller hydro jar washing and drying machine unit, well known in the confectionery trade, is fitted with four Potterton infra-red gas panels used for the final drying of the jars. Each panel has a gas consumption of 20 cu.ft. per hour. This machine is a typical example of the use of gas for bottle or jar washing and drying.

The author illustrated a simple example of the use of a gas-fired Potterton No. 3H Empire boiler (120 cu.ft. per hour) for the heating of water for two bottle washing tanks in a small confectionery factory. He also showed a gas-heated bottle drying table used in conjunction with the bottle washing system. The dryer consists of a Keith Blackman M.P.3 fan and motor directly coupled to an air heater, which in turn is heated by a simple natural-draught burner. The air heater supplies 48 air nozzles and the temperature is controlled by a thermostat placed in the air line. The plant consumes 100-110 cu.ft. per hour of gas at 500 C.V. The output of air heated to 170°-180°F. is 350 cu.ft. per min.

In some machines of this type the air nozzles are opened by virtue of the weight of the bottle being pressed down on a spring-loaded valve. The weight of the jar depresses the spring and releases from the nozzle the air which passes into the jar.

In the manufacture of coconut ice weighed quantities of sugar, glucose, and water are put into a copper pan and brought to a boil of 260°F. on six low-pressure gas-fired sugar boilers, an operation which demands great care and attention to avoid caramelisation of the sugar. Colouring is added and the batch grained slightly against the

side of the pan; the coconut is then put in and the mass poured on to a cooling slab. The batch when set is automatically machine cut. The product is then weighed and packed in cartons, and temporarily stored in a gas-heated room ready for immediate delivery.

Gas-fired sugar boilers are used in the manufacture of fudge and jellies.

It can be said that gas has been prominent in the rapid progress made in the manufacture of sugar confectionery. The present trend to increase output presents the gas industry with a great opportunity to sell gas, and the introduction of new high-speed processes requiring high temperatures conveniently obtained by steam opens up new fields for gas usage.

DISCUSSION

The President, **Mr. W. Johnson,** opened the discussion by saying that one of the difficulties of the industrial gas engineer was getting to know something of the processes in which gas was used. It was essential to study those uses, and he recalled the old Watson House meetings at which some valuable contributions on the uses of gas were made. He remembered an early contribution by Mr. Junkison on the uses of gas in the hairdressing profession.

Mr. N. R. Junkison (North Thames) agreed with the President on the importance of investigating in detail various industries to see how gas was used and where it could be used. He had at one time to do this in respect of the hairdressing profession, and he had been surprised to find the uses there were for gas. In Mr. Junkison's Division of the North Thames Gas Board, they had spent several valuable afternoons discussing one particular industry and fairly exhaustively analysing the uses that were open to them.

Turning to the use of radiant panels for jar drying, he remembered carrying out some experiments in drying jars and bottles. It was found that the globules of water on the glass were extremely difficult to evaporate. The jar would be hot and thoroughly dried except for those globules that formed as the temperature rose. Short of causing some disturbance it did not seem possible to break them up. He asked how successful the radiant panels were.

Mr. G. E. Cox (De La Rue) said he had experience of such globules. If they were subjected to a sufficiently high temperature they could be dispersed, although, of course, the air in the container became saturated, and, on cooling, bottles with a narrow neck tended to retain moisture at that point. With a jar that had a wider neck it dispersed more readily. The British Miller hydro jar washing and drying machine was a steam operated machine, and of course, that machine or any of its type could be heated by direct circulation of the detergents in the tank. By that means they had captured for the industry a certain amount of load for direct-circulating boilers. Another point of interest was a completely new job where well-known manufacturers of machinery for the production of soft drinks and confectionery had contacted him and were at the moment putting-up a plant in a large town on the south coast where sugar was being used for producing a 'Cola' drink in large quantities. In this instance the sugar was not actually boiled, but hot water of a temperature of 160°F. was put into a pan and about half a ton of sugar was poured in and then mixed by a rotating arm. Water for this process was being heated in a large cylinder of about 1,200 gal. capacity by two circulating boilers. That represented another use for gas.

Mr. E. W. B. Dunning (Watson House) said that although Mr. Capper had said sweet rationing had taught adults to appreciate sweets and that now children took more sweets, he still found that we used very much less sugar than before the war. Hence the sugar boiling industry should be using less gas. Had we got back to the pre-war consumption? It might be that we had taken away the load from other fuels, because during the slump period of the war much apparatus had fallen into disuse.

Mr. C. H. Purkis (Watson House) drew attention to the number of references to temperatures and temperature ranges and said he got the impression from the paper that in a number of the processes in the sugar boiling industry the temperature was critical. Mr. Purkis referred to the table of temperatures in which there was a range of about 5°F. and that gave the impression of needing accurate control. And yet he did not see a sign of a thermostat on any sugar boiler illustrated in the paper. Were there any methods of resolving temperatures outside the familiar thermostatic methods?

Mr. Capper, replying, said that in the field of continuous sugar boiling he did not think the gas industry needed to worry about solid fuel. Responding to Mr. Junkison, he said it was always difficult to get details from industry. He spent a lot of time trying to gain necessary information. On the question of additional gas consumption, whereas the North Thames might give different tariffs in their area, in Mr. Capper's area they fixed only one meter for the factory in the sugar boiling industry; and it was difficult to assess the actual increase in gas consumption on the new boilers. The way he obtained some of this information was by taking the normal consumption prior to the end of sugar rationing, and in pre-war years, by taking the additional consumption since de-rationing.

Answering Mr. Dunning, Mr. Capper said they had now increased upon the pre-war consumption of sugar. The last figure he had seen was about 300,000 tons per year. On the subject of thermostatic control, which Mr. Purkis had raised, Mr. Capper said the people in the sugar boiling industry were similar to the artists or craftsmen in the Potteries. Despite the fact that there were gas-fired kilns in the pottery industry, the craftsmen could, they thought, raise exactly the temperature required without thermostatic control. In sugar boiling, too, they rightly or wrongly imagined that they knew almost to a second at what stage the right temperature would be reached. This, however, did not detract from the ultimate need for the fitting and use of thermostatic control.

Mr. E. A. K. Patrick (Watson House) proposed a vote of thanks to Mr. Capper for his paper.

CHEMICAL ENGINEERING GROUP

Mr. H. V. Potter (Immediate Past Chairman) presided at the annual general meeting of the Chemical Engineering Group (S.C.I.) on May 21 in the unavoidable absence of the chairman, Professor F. H. Garner. In its report for 1953 the general committee again recorded a satisfactory year of activity. Close co-operation was maintained with the Institution of Chemical Engineers.

The following were elected to the General Committee: Messrs. G. Brearley, T. K. Ross, R. F. Stewart, and A. S. White. The Chairman paid tributes to the following in declaring their re-election as honorary officers for 1954-55.—Chairman: F. H. Garner; Hon. Secretary: R. C. Odams; Hon. Treasurer: F. A. Greene; Hon. Editor: D. M. Wilson; Hon. Recorder: H. W. Thorp.

At the annual dinner the principal guest was Sir William Ogg, President of the Society of Chemical Industry. Sir Harry Jephcott, President of the Royal Institute of Chemistry, and Mr. Julian M. Leonard, Hon. Treasurer of the S.C.I., were unfortunately unable to attend. Other guests included Mr. W. J. Hooton, Chairman of the British Chemical Plant Manufacturers' Association; Professor M. B. Donald and Mr. F. E. Warner, joint Hon. Secretaries of the Institution of Chemical Engineers; Mr. F. A. Greene, Hon. Treasurer of the Institution; Mr. J. Davidson Pratt, Director, A.B.C.M.; and Dr. E. H. T. Hoblyn, director, B.C.P.M.A.

ROAD TAR JOINT CONSULTATION

Co-operation with surveyors in dealing with the problems of road construction and maintenance have been the distinguishing feature of the British Road Tar Association and its members for many years. Of the various ways in which this co-operation can be achieved, none is likely to be of greater importance than joint consultation between the suppliers and users of tar. The June issue of *Road Tar*, the quarterly publication of the B.R.T.A., records a meeting arranged by Mr. A. B. Blunsden, A.R.I.C., M.I.CHEM.E., Director and Manager, Normandy Park Tar Supply Co., Ltd., with Mr. C. K. Tallack, M.I.MUN.E., A.M.I.C.E., County Surveyor of Lindsey Council, and his Divisional Road Engineers, which took place at Scunthorpe.

Following a conference at which the County Surveyor and his Divisional Road Engineers discussed internal matters concerned with the County, Mr. A. B. Blunsden gave a talk on surface dressing with tar. He dealt with a number of points of practical interest to those responsible for carrying out the work, and stressed the importance of control and supervision of surface dressing operations. Mr. Blunsden replied to a number of questions.

The company adjourned for lunch at the Wortley Hotel which was presided over by Mr. Blunsden. The Lincolnshire Spraying and Contracting Co., Ltd., was represented by Mr. R. Pacey. Among those present were a number of other guests, of whom were Mr. J. Davidson Pratt, C.B.E., Chairman of the British Road Tar Association, and Mr. W. E. Cons, Technical Adviser to the Association. Mr. Blunsden, in welcoming the guests, said that the meeting had been arranged for the purpose of discussing mutual problems. Mr. Tallack and Mr. Davidson Pratt paid tribute to the good work which had been done by Mr. Blunsden.

By the courtesy of Dr. W. H. Glanville, C.B., C.B.E., Director of Road Research, Road Research Laboratory, Harmondsworth, a lecture on 'Soil Stabilisation' was given by Mr. K. A. Clare, B.SC., A.R.I.C., illustrated by lantern slides and a short film. The meeting was in every way successful.

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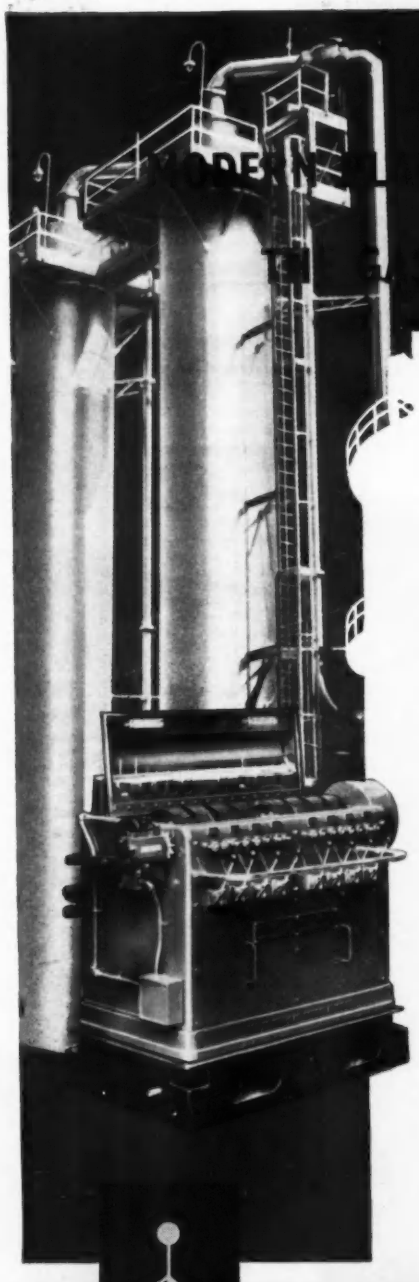

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C. W. G. IN NORTH THAMES

By J. BURNS—Concluded from p. 565.

Special attention was directed in the first test to the maximum output which could be obtained with four sets at work, noting particularly the steam and power balances on the sets, for it was appreciated that very high outputs might deleteriously affect the steam balance. All these considerations, however, were related to the local conditions at Beckton, where there was a certain amount of external low pressure steam available from a nearby producer gas plant and where, in any case, high pressure steam was made very cheaply from breeze. Table 2 shows the principal results of the test at maximum output on four sets, though it will be appreciated that many further aspects of operation in the plant were investigated.

The results of this test indicate certain restrictions in the ability of the ancillary plant to handle all the gas which could be made from four generators. Accordingly, another test (Table 3) was carried out, working only two generators at maximum output.

One of the characteristics of both these tests is the high steam consumption; and it was felt that some of the steam was being condensed on the very large grate area cooled by the atmosphere at the base of the set. Steps are now in hand to dry the steam going into the base of the generator and to pre-heat the blast, and it is felt that these two steps may improve the overall efficiency of the plant. Excessive wear was also experienced on the grate as a result of the cold conditions at the base of the set, these conditions obtaining primarily before we had full knowledge on how to operate the plant. With a better appreciation of operating conditions and especially with the hotter fire conditions on the grate the amount of wear is now very much less and, all in all, this price has not been an unreasonable one to pay for pioneering work on one aspect of carburetted water gas manufacture.

TABLE 2.

BECKTON No. 2 CARBURETTED WATER GAS PLANT

Internal Diameter of Generator 9 *ft.* *Blast Pressures* 58 *in. W.G.*

PRINCIPAL RESULTS OF PERFORMANCE TEST ON FOUR SETS	
Duration of test, hours per set	168
Inspection of fire, hours per set, average	3.6
Cut-outs and maintenance, hours per set, average	0.9
Gas-making time, hours per set, average	163.5
No. of cycles completed per set, average	3,996
No. of cycles completed, total	15,982
Carburetted Water Gas	
Total gas made, purified, mill. cu. ft.	160.079
Gas made per day, mill. cu. ft. per set	5.717
Gas made per hour of gas-making time, cu. ft. per set	244,800
Gas made per cycle, cu. ft.	10,017
Inerts in gas, %	12.4
Calorific value, B.Th.U. per cu. ft.	483.2
Daily output, therms per set	27,625
Blue Water Gas	
B.W.G. per 1,000 cu. ft. C.W.G. (including waste gas), cu. ft.	786
B.W.G. made per day, therms per set	13,309
B.W.G. made per hour of gas-making time, therms per set	570
B.W.G. made per hour per sq. ft. of generator cross-section, therms	8.96
Thermal efficiency of B.W.G. production, %	62.3
Overall thermal efficiency of B.W.G. production, %	60.7
Coke	
Total coke supplied to plant, tons	2,433.4
Moisture in coke, %	8.2
Dry weight of coke, tons	2,235.0
Breeze removed at inlet of generator, tons	114.6
Moisture in breeze, %	10.7
Dry weight of breeze, tons	102.7
Net dry coke to generator, tons	2,132.6
Net dry coke per 1,000 cu. ft. C.W.G., lb.	29.84
Therms B.W.G. per 1,000 lb. dry coke	78.0
Therms B.W.G. per ton dry coke	174.7
Therms B.W.G. per ton coke at 4% moisture	167.8
Ash in coke to generators, % D.B.	11.5
Gas Oil	
Total oil supplied to carburettor, gal.	282,913
Oil used per 1,000 cu. ft. C.W.G., gal.	1.77
Yields of oil gas per gal. of oil, therms	1.42
Analysis of gas oil—paraffin and unsaturated hydrocarbons, % by volume	75
Ashes	
Dry weight of material discharged, tons	258.56
Carbon content, %	21.3
Carbon content as % of carbon in coke used	3.0
Fliers Collected in Grit Arrestor	
Average weight per cycle, lb.	4.79
Total weight, tons	34.21
Weight per 1,000 cu. ft. C.W.G., lb.	0.48
Carbon content, %	78.3
Carbon content as % of carbon in coke used	1.5
Annular Boiler	
Boiler pressure, lb. per sq. in.	36
Steam raised at 36 lb. per sq. in., lb. per hour	19,400
Steam raised at 36 lb. per sq. in., lb. per 1,000 cu. ft. C.W.G.	20.4
Waste Heat Boiler	
Temperature of superheated steam, °C	310
Boiler pressure, lb. per sq. in.	275
Steam raised at 275 lb. per sq. in., lb. per hour	27,350
Steam raised at 275 lb. per sq. in., lb. per 1,000 cu. ft. C.W.G.	28.7
Process Details	
Duration of cycle, min.	2.40
Air-steam ratio, cu. ft. per lb.	30.5
Process steam used, lb. per 1,000 cu. ft. C.W.G.	54 0
Back-run steam, % of steam to fuel bed	41.6
Steam to set decomposed %	39.3

. Includes 'H.C.V.' steam, but excludes some condensate.

BALANCE OF STEAM AND POWER PRODUCTION AND CONSUMPTION

(*a*) Steam raised:		
In waste heat boilers	459.48 units (10,000 lb.)	
In annular boilers	325.93 ,,	
	785.41 ,,	
(*b*) Steam used, other than process:		
Turbo-alternator	428.40 units	
Feed pumps	28.56 ,,	
Total	456.96 ,,	
Less condensate	28.56 ,,	
Pass-out to process	428.40 ,,	
(*c*) Steam to process:		
Pass-out from turbine, etc.	428.40 units	
Annular boilers	325.93 ,,	
L.P. accumulator	12.87 ,,	
L.P. steam from producer plant	64.34 ,,	
H.P. steam from works	58.78 ,,	
	890.32 ,,	
Trap losses, etc. (estimated)	13.78 ,,	
	876.54 ,,	
Cushion steam to W.H. boiler	9.60 ,,	
	866.94 ,,	

Steam deficit = 123.12 units, or 13.8% = 8 lb. per 1,000 cu. ft. C.W.G.
Steam consumption estimated from plant operating date, 863 units.

(*d*) Electric power:	
Generated by turbo-alternator	114,770 kWh
Less power exported	400 ,,
	114,370 ,,
Add power imported	15,800 ,,
Power used on gas-making and ancillary plant	130,170 ,,

Power deficit = 15,400 kWh, or 11.8% = 0.096 kWh per 1,000 cu. ft. C.W.G

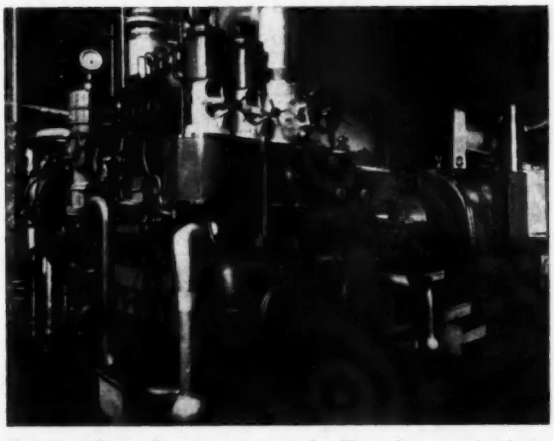

Fig. 2.—The turbo-generator on the Humphreys and Glasgow plant at Beckton.

These tests were carried out by members of the research staff of the Fulham laboratory of the North Thames Gas Board, and the results are published with the permission of the Gas Council.

New Water-sealed Grates in the Board

With nationalisation, the newly formed North Thames Gas Board became the possessor of two new, partly constructed, water gas plants at Mill Hill and Romford. These plants were of the latest design by Humphreys and Glasgow, Ltd., but based on the water-sealed grate and not the dry-sealed grate as at Brentford; and the Board

TABLE 3.

BECKTON NO. 2 CARBURETTED WATER GAS PLANT

Internal Diameter of Generator 9 ft. *Blast Pressure 62 in. W.G.*

PRINCIPAL RESULTS OF PERFORMANCE TEST ON TWO SETS

Duration of test, hours per set	96
Inspection of fire, hours per set, average	1.6
*Cut-outs and maintenance, hours per set, average	8.6
Gas-making time, hours per set, average	85.8
No. of cycles completed per set, average	2,157
No. of cycles completed total	4,314
Carburetted Water Gas	
Total gas made, purified, mill. cu. ft.	47.288
Gas made per day, mill. cu. ft. per set	5.911
Gas made per hour of gas-making time, cu. ft. per set	275,600
Gas made per cycle, cu. ft.	10,960
Inerts in gas, %	12.9
Calorific value, B.Th.U. per cu. ft.	504.2
Daily output, therms per set	29,805
Blue Water Gas	
B.W.G. per 1,000 cu. ft. C.W.G. (including waste gas) cu. ft.	770
B.W.G. made per day, therms per set	13,200
B.W.G. made per hour of gas-making time, therms per set	613
B.W.G. made per hour per sq. ft. of generator cross-section, therms	9.64
Thermal efficiency of B.W.G. production, %	60.9
Overall thermal efficiency of B.W.G. production, %	58.5
* 7 hours lost due to failure of explosion panel.	
Coke	
Total coke supplied to plant, tons	686.3
Moisture in coke, %	7.5
Dry weight of coke, tons	634.8
Breeze removed at inlet of generator, tons	26.5
Moisture in breeze, %	8.4
Dry weight of breeze, tons	24.2
Net dry coke to generator, tons	610.6
Net dry coke per 1,000 cu. ft. C.W.G., lb.	28.92
Therms B.W.G. per 1,000 lb. dry coke	77.1
Therms B.W.G. per ton dry coke	172.7
Therms B.W.G. per ton coke at 4% moisture	165.7
Ash in coke to generators, % D.B.	11.7
Gas Oil	
Total oil supplied to carburettor, gal.	94,608
Oil used per 1,000 cu. ft. C.W.G., gal.	2.00
Yield of oil gas per gal. of oil, therms	1.41
Analysis of gas oil, paraffin + unsaturated hydrocarbons, % vol.	76
Ashes	
Dry weight of material discharged, tons	76.93
Carbon content, %	20.25
Carbon content, as % of carbon in coke used	3.0
Fliers Collected in Grit Arrestor	
Average weight per cycle, lb.	14.85
Total weight, tons	28.60
Weight per 1,000 cu. ft. C.W.G., lb.	1.35
Carbon content, %	84.5
Carbon content as % of carbon in coke used	4.7
Annular Boiler	
Boiler pressure, lb. per sq. in.	36
Steam raised at 36 lb. per sq. in., lb. per hour	10,350
Steam raised at 36 lb. per sq. in., lb. per 1,000 cu. ft. C.W.G.	21.0
Waste Heat Boiler	
Temperature of superheated steam, °C.	320
Boiler pressure, lb. per sq. in.	280
Steam raised at 280 lb. per sq. in., lb. per hour	15,534
Steam raised at 280 lb. per sq. in., lb. per 1,000 cu. ft. C.W.G.	31.7
Process Details	
Duration of cycle, min.	2.4
Air-steam ratio, cu. ft. per lb.	32.1
*Process steam used, lb. per 1,000 cu. ft. C.W.G.	51.0
Back-run steam, % of steam to fuel bed	36.5
Steam to set decomposed, %	35.7

* Includes 'H.C.V.' steam.

BALANCE OF STEAM AND POWER PRODUCTION AND CONSUMPTION

(*a*) Steam raised:		
In waste heat boilers	148.10 units	(10,000 lb.)
In annular boilers	99.39	"
	247.49	"
(*b*) Steam used, other than process:		
Turbo-alternator	146.98 units	
Feed pumps	7.50	"
Total	154.48	"
Less condensate	16.42	"
Pass out to process	138.06	"
(*c*) Steam to process:		
Pass-out from turbine, etc.	138.06 units	
Annular boilers	99.39	"
L.P. accumulator	1.69	"
L.P. steam from producer plant	15.19	"
H.P. steam from works (excluding supply to turbine)	23.32	"
	277.65	"
Trap losses, etc. (estimated)	3.93	"
	273.72	"
Cushion steam to W.H. boiler	2.74	"
	270.98	"
Steam deficit = 43.09 units, or 15.7% = 9.1 lb. per 1,000 cu. ft.		
Steam consumption estimated from plant operating data, 241.2 units.		
(*d*) Electric power:		
Generated by turbo alternator	32,440 kWh	
Less power exported	600	
	31,840	
Add power imported	16,500	
Power used on gasmaking and ancillary plant	48,340	

Power deficit = 15,900 kWh, or 32.9% = 0.336 kWh per 1,000 cu. ft. C.W.G.

had thus the unique opportunity of comparing the results from the then most modern water-sealed sets developed by Humphreys and Glasgow and the dry-sealed grate sets at Beckton. Both the plants at Romford and Mill Hill give outstandingly good results with reliability of operation. They fall behind the Brentford and Beckton sets from the point of view of output per unit of generator area and, therefore, have increased capital and labour costs per therm of gas produced. It is still too early to determine whether their repair and maintenance costs are likely to be less than those at Brentford and Beckton. This also will be the subject of further investigations.

It is interesting to set down the results of a test carried out on the plant at Romford for comparison purposes with those at Beckton (Table 4).

TABLE 4.

ROMFORD CARBURETTED WATER GAS PLANT

Internal Diameter of Generator, 7 ft. *Blast Pressures, 28 in. W.G.*

PRINCIPAL RESULTS OF PERFORMANCE TEST

Duration of test, hours	170
Inspection of fire, hours	4
Cut-outs and maintenance, hours	13.3
Gas-making time, hours	152.7
No. of cycles completed	3,746
Carburetted Water Gas	
Total gas made, purified, mill. cu. ft.	17.647
Gas made per day, mill. cu. ft.	2.491
Gas made per hour of gas-making time, cu. ft.	115,570
Gas made per cycle, cu. ft.	4,711
Inerts in gas, %	13.5
Calorific value, B.Th.U. per cu. ft.	511.6
Daily output, therms	12,744
Blue Water Gas	
B.W.G. per 1,000 cu. ft. C.W.G., cu. ft.	743
B.W.G. made per day, therms	5,273
B.W.G. made per hour of gas-making time, therms	245
B.W.G. made per hour per sq. ft. of generator cross-section, therms	6.07
Thermal efficiency of B.W.G. production, %	56.5
Coke	
Total coke supplied to plant, tons	294.6
Moisture in coke, %	7.6
Dry weight of coke, tons	272.2
Breeze removed at inlet of generator, tons	42.2
Moisture in breeze, %	13.4
Dry weight of breeze, tons	36.5
Net dry coke to generator, tons	235.7
Net dry coke per 1,000 cu. ft. C.W.G., lb.	29.92
Therms B.W.G. per 1,000 lb. dry coke	70.8
Therms B.W.G. per ton dry coke	158.5
Therms B.W.G. per ton coke at 4% moisture	152.1
Ash in coke to generator, % D.B.	11.0
Gas Oil	
Total oil supplied to carburettor, gal.	37,837
Oil used per 1,000 cu. ft. C.W.G., gal.	2.14
Yield of oil gas per gal. of oil, therms	1.40
Analysis of gas oil—	
Paraffin + unsaturated hydrocarbons, % by volume	77
Ashes	
Dry weight of material discharged, tons	27.69
Carbon content, %	24.15
Carbon content as % of carbon in coke used	3.3
Fliers Collected in Grit Arrestor	
Average weight per cycle, lb.	2.18
Total weight, tons	3.65
Weight per 1,000 cu. ft. C.W.G., lb.	0.46
Carbon content, %	68.85
Carbon content as % of carbon in coke used	1.2
Annular Boiler	
Boiler pressure, lb. per sq. in.	39
Steam raised at 39 lb. per sq. in., lb. per hour	2,716
Steam raised at 39 lb. per sq. in., lb. per 1,000 cu. ft. C.W.G.	23.7
Waste Heat Boiler	
Boiler pressure, lb. per sq. in.	125
Steam raised at 125 lb. per sq. in., lb. per hour	4,230
Steam raised at 125 lb. per sq. in., lb. per 1,000 cu. ft. C.W.G.	36.4
Process Details	
Duration of cycle, min.	2.45
Air-steam ratio, cu. ft. per lb.	52
*Process steam used, lb. per 1,000 cu. ft. C.W.G.	37.0
Back-run steam, % of steam to fuel bed	55.3
Steam to set decomposed, %	47.0

* Includes 'H.C.V.' steam.

BALANCE OF STEAM AND POWER CONSUMPTION AND PRODUCTION

		lb. per 1,000 cu. ft. C.W.G.
Process Steam Consumption		
Up-run		14.6
Back-run		21.3
'H.C.V.' steam		1.1
	Total	37.0
'Curtain steam' (W.H. boiler)		0.5
'Purge steam' (oil spray)		0.7
Pumps, exhauster, etc.		8.5
		46.7
Steam Production		
Annular boiler (estimated)		23.7
W.H. boiler (estimated)		36.4
		60.1
Steam surplus (with electricity driven blower)		13.4 or 22.4%
Steam deficit (with turbo-driven blower)		9.6 or 16.0%
Electric Power		
Total power consumed by blower and by ancillary plant		0.45 kWh per 1,000 cu. ft. C.W.G.

The load in the North Thames Gas Board continued to show the rapid increase previously experienced in the

Gas Light and Coke Company and shortly after vesting day there arose the necessity for still further gas production plant. Decisions on the type of plant to use had to be taken even before we were able to get full operating results from our plants at Beckton; but by this time our minds were attuned to the possibilities of high outputs from water gas plants even though these possibilities were not proved. With the author as Chief Engineer to the Board we began to think of even bigger outputs than those we had catered for in the first plant at Beckton. We repeated the team effort which led to the Beckton plant, but on this occasion our designs were directed to a plant which would operate mainly on a seasonal load basis without the all-time necessity of producing blue water gas for base load purposes. A simplified steam usage system was employed and every endeavour was made to match the capital costs to the probable load factor which the plant would have to meet. The dry-sealed grate was chosen again and the plants included the flexibility of operation accorded by high blast pressure. The basic output of these plants was considered to be 6 mill. bigger generator per day, and a plant of three such generators was ordered for Beckton to be placed alongside the existing Humphreys and Glasgow plant. This plant is now nearing completion by the Power Gas Corporation, and it is hoped that results will be available from it during the coming year.

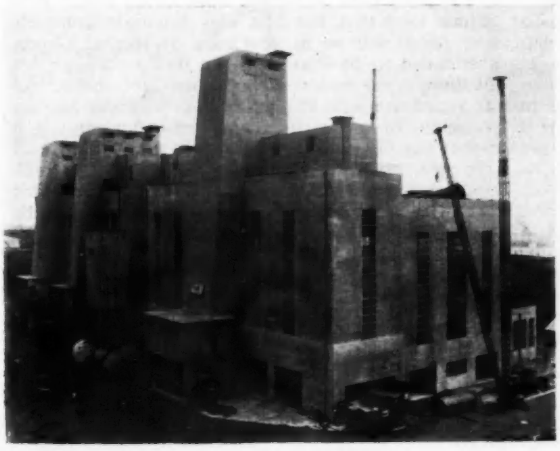

Fig. 3.—The Power Gas plant and Humphreys and Glasgow plant at Beckton.

A further carburetted water gas plant was ordered for the Southall station, but the load conditions at this station permitted only two 3 mill. generators with one 6 mill. generator. These three sets were built by Humphreys and Glasgow. The two 3 mill. sets are, in many respects, replicas of the original Brentford sets and are giving very satisfactory results. The big 6 mill. set came into operation in January of this year and, so far, this plant snows a very high efficiency of operation and promises to be a most useful addition to the Board's capacity for the production of large quantities of reasonably cheap gas at short notice. This set is already producing up to 8 mill. cu.ft. per day in normal operation and will probably produce more when completely run in.

Table 5 shows the first test results obtained from this plant after it had been in operation for about six weeks only.

Comparative Results from Different Sets

All the tests carried out on the various plants used coke produced in static carbonising plant from Durham coal. We have no experience of the effect of very high blast pressures on more friable coke produced in continuous vertical retorts from coals other than Durham coals.

One can now get some very interesting comparative statistics of these various units of plant, and I think the following figures will show that the most outstanding factor is the excellent output that you can get per square foot of grate area from a dry-sealed grate. The other outstanding factor is the very much higher steam consumption which we experienced with the methods we employed to get high output on the dry-sealed grates at Brentford, Beckton, and Southall. The balance between these two factors is one which must be determined primarily on local conditions and on the purpose for which the set is, in fact, installed. It is sufficient to say at this stage that the very high output which can be obtained on the sets at Beckton helped materially to assist the Board to meet a consumption of 394 mill. cu.ft. in one day on February 1 of this year, especially when this maximuch output represented a difference of 50 mill. cu.ft. per day over the highest output previously recorded.

TABLE 5.

SOUTHALL NO. 2 CARBURETTED WATER GAS PLANT

Internal Diameter of Generator, 11 ft. *Blast Pressure 40 in. W.G.*

PRINCIPAL RESULTS OF PERFORMANCE TEST ON ONE SET

Duration of test, hours	48
Gasmaking time, hours, average	46.6
Number of cycles completed	1,118
Carburetted Water Gas	
Total gas made, purified, mill. cu. ft.	16.179
Gas made per day, mill. cu. ft.	8.090
Gas made per hour of gas-making time, cu. ft.	347,200
Gas made per cycle, cu. ft.	14,470
Inerts in gas, %	15.7
Calorific value, B.Th.U. per cu. ft.	510.1
Daily output, therms	41,267
Blue Water Gas	
B.W.G. per 1,000 cu. ft. C.W.G. (including waste gas) cu. ft.	794
B.W.G. made per day, therms	17,774
B.W.G. made per hour of gas-making time, therms	763
B.W.G. made per hour per sq. ft. of generator, cross-section, therms	8.03
Thermal efficiency of B.W.G. production, %	59
Coke	
Total coke supplied to plant, tons	259.4
Moisture in coke, %	8.5
Dry weight of coke, tons	237.3
Breeze removed at inlet of generator, tons	29.1
Moisture in breeze, %	13.0
Dry weight of breeze, tons	25.3
Net dry coke to generator, tons	212.0
Net dry coke to generator per 1,000 cu. ft. C.W.G., lb.	29.35
Therms B.W.G. per 1,000 lb. dry coke	74.9
Therms B.W.G. per ton dry coke	167.8
Therms B.W.G. per ton coke at 4% moisture	161.1
Ash in coke to generator, % D.B.	10.2
Gas Oil	
Total oil supplied to carburettor, gal.	34,635
Oil used per 1,000 cu. ft. C.W.G., gal.	2.14
Yield of oil gas per gal. of oil, therms	1.36
Analysis of gas oil—	
Paraffins + unsaturated hydrocarbons, % by volume	77.5
Ashes	
Dry weight of material discharged, tons	23.0
Carbon content, %	17.9
Carbon content as % of carbon in coke used	2.2
Fliers Collected in Grit Arrestor	
Average weight per cycle, lb.	11.72
Total weight, tons	5.85
Weight per 1,000 cu. ft. C.W.G., lb.	0.81
Carbon content, %	82.9
Carbon content as % of carbon in coke used	2.6
Annular Boilers	
Boiler pressure, lb. per sq. in.	30
Steam raised at 30 lb. per sq. in., lb. per hour	5,250
Steam raised at 30 lb. per sq. in., lb. per 1,000 cu. ft. C.W.G.	15.1
Waste Heat Boilers	
Boiler pressure, lb. per sq. in.	150
Steam raised at 150 lb. per sq. in., lb. per hour	9,930
Steam raised at 150 lb. per sq. in., lb. per 1,000 cu. ft. C.W.G.	28.6
Process Details	
Duration of cycle, min.	2.5
Air-steam ratio, cu. ft. per lb.	28.6
*Process steam used, lb. per 1,000 cu. ft. C.W.G.	56.0
Back-run steam, % of steam to fuel bed	34.2
Steam to set decomposed, %	30.0

* Includes 'H.C.V.' steam.

For the conditions obtaining in the Board there is a considerable overall financial saving in the use of the large-capacity dry-sealed sets over the smaller water-sealed sets with which we have had experience.

TABLE 6.

COMPARISON OF TEST RESULTS FOR C.W.G. PLANTS

	Brentford Table 1	Beckton Table 2	Beckton Table 3	Romford Table 4	Southall Table 5
C.V. of gas made, B.Th.U per cu. ft.	494	483.2	504.2	511.6	510.1
Dry coke, lb. per 1,000 cu. ft. C.W.G.	31.08	29.84	28.92	29.92	29.35
Oil used, gal. per 1,000 cu. ft. C.W.G.	2.01	1.77	2.00	2.14	2.14
Therms per gal. of oil	1.25*	1.42	1.41	1.40	1.36
Therms B.W.G. per ton dry coke	170.7	174.7	172.7	158.5	167.8
Therms B.W.G. per hour per sq. ft. generator cross-section	6.95	8.96	9.64	6.07	8.03
Process steam, lb. per 1,000 cu. ft. C.W.G.	54.1	54.0	51.0	37.0	56.0
Blast pressure, in. W.G.	31	58	62	28	40

* The oil used in this test contained only 65.5% of paraffin and unsaturated hydrocarbons.

It is interesting at this stage to look back on the decisions taken in 1947 concerning the installation of large water gas plants. Events have shown that these decisions were sound, for since then the capital costs, and indeed the overall costs per therm of carburetted water gas, have not increased so rapidly as the overall costs of, say, coal

gas; and the high-output carburetted water gas set has played an important part in this development. A late published position in this comparison appears in 'The Effect of Load Variation on Costs'—Dr. J. Burns and L. J. Clark, I.G.E. Communication No. 417.

The Use of Heavy Oil

We, like many other boards in this country, are very much perturbed at the high costs we have to pay for coal and the possibility of diminishing supplies of coal, but are heartened to a certain extent by the possibilities of increasing supplies of oil. We are clear, however, that the possibility of increasing supplies of oil could be dangerous for the gas industry if we do not make efficient use of that oil. Oil could very well displace some of the industrial load which we now supply with gas. Heavy oil is the principal danger, for it is essentially a by-product of the refining industry. Clearly, there are tremendous advantages in the use of plants which can gasify this heavy oil by itself without having to be associated with the gasification of coke. This requires a plant which can produce from heavy oil a gas of any desired calorific value and of the same essential combustion characteristics as coal gas. Such plants are being developed, and much credit is due to the South Eastern Gas Board for its work in this country on that aspect of oil gasification and to Humphreys and Glasgow for their introduction of the O.N.I.A.-G.E.G.I. process. In addition to these plants, however, the industry has a very high amount of capital invested in its carburetted water gas plants, and it would be of advantage for us to try to use a certain amount of heavy oil on these plants. This aspect of gasification was also one of the author's terms of investigation in America, where heavy oil is pumped at very high rates into the carburettor and the carburettor is cleaned out over a period of two hours in every 24. The author was quite clear in his opinion that this method of operation would not be entirely suitable for conditions in this country.

We have now carried out much work on heavy oil gasification in carburetted water gas plants. In fact, as mentioned previously, we started in the Gas Light and Coke Company in 1930, and the work done then formed the basis of the investigation carried out during the past years. We started off somewhat afraid of having to store heavy oil separately from our gas oil, and we thought that we could prepare a suitable mixture of the two in our existing unheated gas oil tanks. We were able to do this quite successfully, and carried out a lot of work at our Stratford works on the gasification of this mixture containing up to 30% of heavy oil in the carburettor in the usual way. Operation was simple and no real difficulties were encountered until the plant had been in operation for some three weeks to a month, when we found that the carburettors were gradually becoming choked with carbon. This does not give us the degree of reliability which we require for operation on our water gas plants, and we are now seeking to prevent this carbon deposition. Using a heavy oil with approximately 8% Conradson carbon, it is possible to produce approximately 1.01 therms from each gallon of that oil. This is just economic compared with 100% gas oil at the price differential between gas oil and heavy oil obtaining in the Board. We carried out parallel work at Brentford but injected the heavy oil direct into the generator. Operation at 20% of heavy oil presents no major difficulties, but the thermal yield from the heavy oil is less at approximately 0.86 therms per gal.; and economically this form of gasification is not so attractive.

This work I consider to be well worth while; and we hope to continue to use in our normal water gas plants many thousands of gallons of heavy oil per annum.

Gasification of Non-Coking Coal

The Board is now considering and, in fact, has made up its mind on, another aspect of water gas production—this time not from coke but from non-coking coal. It is hoped before long that the first Gas Integrale complete gasification plant will be in operation at Kensal Green. It is not intended to go into detail on this process at this stage, but there is no reason why the industry should not be just as successful with this process as we have been in the development of ordinary carburetted water gas. It is expected that the G.I. process will gasify non-coking coal of suitable size, probably graded to the form of trebles, producing therefrom a gas of a calorific value of some 320 B.Th.U. per cu. ft. with the enrichment of that gas by means of gas oil or heavy oil in the way already well known to us in carburetted water gas manufacture. The big drawback to this process is that we require graded fuel for optimum operation. We appreciate that, just as in water gas plants, we shall probably be able to use small fuel but at a sacrifice of output. There will, no doubt, be many places up and down the country, just as at Kensal Green, where a plant of this type, if it is successful, would be very suitable. This is the case especially where we have to meet an increasing load without disturbing the existing coke market.

Coke Grate Economy

The North Western Gas Board is to make available to householders throughout the North West modern coke grates with gas ignition on easy payments which amount to little more than a penny a day. This was disclosed by Mr. S. G. Deavin, Secretary of the Board, at the annual meeting of the North Western Division of the National Smoke Abatement Society, held in Manchester on May 27. Wherever proper appliances were available, said Mr. Deavin, coke could be burnt with greater efficiency than coal, which meant that if 1 cwt. of coke cost the same as 1 cwt. of coal then one hour's heating by coke was cheaper than one hour's heating by coal.

Figures given by Mr. Deavin showed that a Manchester householder could save up to £9 17s. 6d. per annum on his bills for room and water heating by changing over from coal burnt in an old-fashioned grate to coke burnt in a modern grate. 'The idea that coke is coal with all the goodness taken out of it is no more true than that petrol is crude oil with all the goodness taken out of it,' said Mr. Deavin. 'Both coke and petrol are refined products in their own right.'

Since 1949, the North Western Gas Board had spent some £3 mill. on modern plant to improve the quality of the coke offered to consumers in the area.

The Board had set itself to concentrate on endeavouring by increased efficiency to reduce the cost of distribution, of consumer services, and administration. Its aim was to cut these costs and thus get down the price of both gas and coke as soon as it could. In striving for this improved efficiency it did not only send round teams to inspect the administration; it also examined new methods of carbonisation, and the 'Rochdale Process' experiments, which promised to be very successful, were an example of the outcome.

The Scandinavian countries now wanted the North Western Board's large coke above all others in the country because of its superior quality. What it could do in the export market it could certainly do in the home market. The Board was aiming, in consultation with merchant distributors, at the formation and the building up of a coke marketing scheme directed solely to improving the quality and services given in this refined smokeless fuel.

Last year the Ministry of Fuel and Power suddenly decided that as there was a shortage of coal it would cut the allocation to the gas industry, said Mr. Deavin. This had an effect on the amount of coke available and if the same thing happened this year difficulties might again arise in the supply of coke.

The North West, however, had coke supplies which were considered to be sufficient for the winter.

Announcing that the Board was prepared to sell and install modern coke grates with gas ignition for as little as 8d. a week, Mr. Deavin said the Board was determined to assist the consumer as much as possible with the modern grate.

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the Main No. 93 GAS RANGE

- Oven capacity 5 cu. ft.
- Fitted with Mainstat automatic oven-heat control
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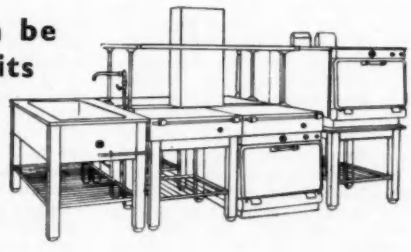
- Also available with open-top hotplate and four boiling burners

The No. 93 Range is a new Main design, incorporating features that ensure better cooking results with less attention. It is economical on gas consumption and strongly constructed to withstand continuous heavy-duty use. Full details are available on application.

composite range suites can be built up from matching units

the following units of the 93 Series are available : Boiling Tables with solid or open-top hotplates ; General-Purpose Ovens on legs or in tiers ; Hot-Closets with or without Bain Marie. The suite illustrated right comprises 2 solid top ranges ; 2 boiling tables, one with solid-top, one with open-top ; 2 general purpose ovens on stands ; and a Bain Marie.



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Greater Freedom for Industry

Forty-ninth Report of the Society of British Gas Industries

The Council of the Society of British Gas Industries has issued its 49th annual report, in which it endorses the references in the fourth annual report of the Gas Council to the problems created for the industry by the limited supplies of capital and materials available to the gas industry, particularly coal, steel, and cast iron. The industry's share in the national capital investment programme was approximately the same for 1952-53 as for 1951-52, and broadly this was stated to be in balance with the structural materials allotted to the industry—steel, cast iron, and timber. Emphasis was again laid on the heavy price increases and the decreasing availability of good gas-making coals, which gave added incentive not only to means of increasing the efficiency of existing processes, but also to the search for new processes and new sources of supplies of gas.

During the last year or two, the Gas Council's publicity has been concentrated on encouraging efficiency in utilisation and economy in the use of gas. It has set out to show consumers how to get the best service from their appliances. Latterly a much more positive publicity approach has become possible, which will be widely welcomed as it develops. The Society's members concerned themselves spend large sums of money annually on general publicity, national and local Press advertising, exhibitions, and so on, and there has been increasing co-operation between these members and the Gas Council in the work of the publicity, Press and information services. The Gas Section at the Ideal Home Exhibition in London which is devoted to domestic uses, and at which S.B.G.I. members take individual stands, is now an important annual event. This year there were cookery demonstrations continuing throughout the period of the exhibition. In connection with the annual Gas Sales and Service Conference organised by the Gas Council, the Society's members are staging each year fully representative exhibitions of appliances. Joint consultative committees between the Gas Council and the S.B.G.I. are doing valuable work as the focal point for discussions of a wide range of subjects of mutual interest.

Among other directions in which the Gas Council and the S.B.G.I. are working together, one of the most important is the task of securing agreement on the adoption of conditions of contract to govern the erection and supply of plant on which the Society's members are engaged for the gas industry. Contracts running in total into large sums of money are being executed and it is obviously most important for all concerned that there should be a set of conditions negotiated at national level to govern work of this magnitude. In addition a joint committee of the Gas Council and the S.B.G.I. is seeking to produce in co-operation a standard specification for refractory materials for gasworks, and latterly the British Coking Industry Association has been brought into the discussions in the hope that a document could be evolved that would apply both to the gas industry and to the coking industry.

The long tradition of co-operation with the Institution of Gas Engineers is maintained and the Society's members are giving valuable service on various committees of the Institution. The Society was particularly glad to have the opportunity of nominating three candidates for the successful course in management studies that was held at the Brooklands County Technical College in the summer. It seemed admirable that candidates from S.B.G.I. members and from area boards should share a course of this sort.

Research

The plan for collaboration on research worked out between the Gas Council and the S.B.G.I. provided for the setting up of a Joint Consultative Committee on Research between the two bodies. It was decided that this Committee should be a policy committee, but that it should not be tied by precise terms of reference and thus be free to discuss any research matters either party might suggest. A Research Committee of the S.B.G.I. was also set up to provide the Society with machinery to deal with any questions that might be referred to it by the Joint Committee. Work reserved respectively to the Gas Council and to individual S.B.G.I. firms and work undertaken by mutual arrangement between the Gas Council or area boards and one or more individual firms were excluded from the field of potential co-operation at national level. It is particularly important to avoid duplication when already such an immense amount of work is being done by the Gas Council, by the Society's members individually, and by research organisations to which either or both contribute, and by any or all of them in co-operation. The Joint Committee interpreting 'research' in a wide sense is taking stock of the position along various lines of study.

Home Trade

The total steel production in this country for 1953 was estimated at 17,600,000 tons, and if the steel industry's expectations are fulfilled a figure approaching 18,500,000 tons may be realised in 1954. The suggestion is therefore that the consuming industries will be able to obtain ample supplies of all the grades of steel required. This has not been the experience of the Society's members in 1953, since for instance there have been very considerable difficulties in getting supplies of heavy steel plate for gasworks plant. A steel plate distribution scheme was introduced in the spring of 1953 to operate on a voluntary basis, but the members concerned have in fact received little conscious benefit from it. The consuming industries believe that on the long term it is essential that the steel industry should increase its rolling facilities for heavy plate, since the percentage of steel plate to total steel requirements in industry as a whole has been rising for years and will certainly continue to rise. Every effort has been made on the short term to ensure that the gas industry should get its fair share of present production, but increasingly the view is taken that steel users must rely primarily on their ability to deal with their problems themselves, including in certain circumstances the importation of steel.

By and large the year witnessed an improvement for manufacturers engaged in the production of appliances, though the improvement came late in the year and was not by any means uniform throughout the range. Sales of appliances have been assisted by the removal of restrictions on promotional publicity and selling by area boards, and some benefit was derived from the lowering of purchase tax in the Budget. The most serious problem remains, however, the effect of hire purchase restrictions imposed in 1952. The Society has actively stressed the serious result of these restrictions and it was therefore a matter of great satisfaction when they were removed in August from water heating appliances. The effect was as speedy and as beneficial as the effect of the imposition of the restrictions had been damaging. The Order still applies, however, to gas space heating appliances and to hand-operated gas heated washing machines. It has the effect of keeping in service old and obsolete appliances that are inefficient and wasteful by up-to-date standards, and it denies reasonable facilities to the public for replacing smoke and smog producing appliances by smokeless appliances.

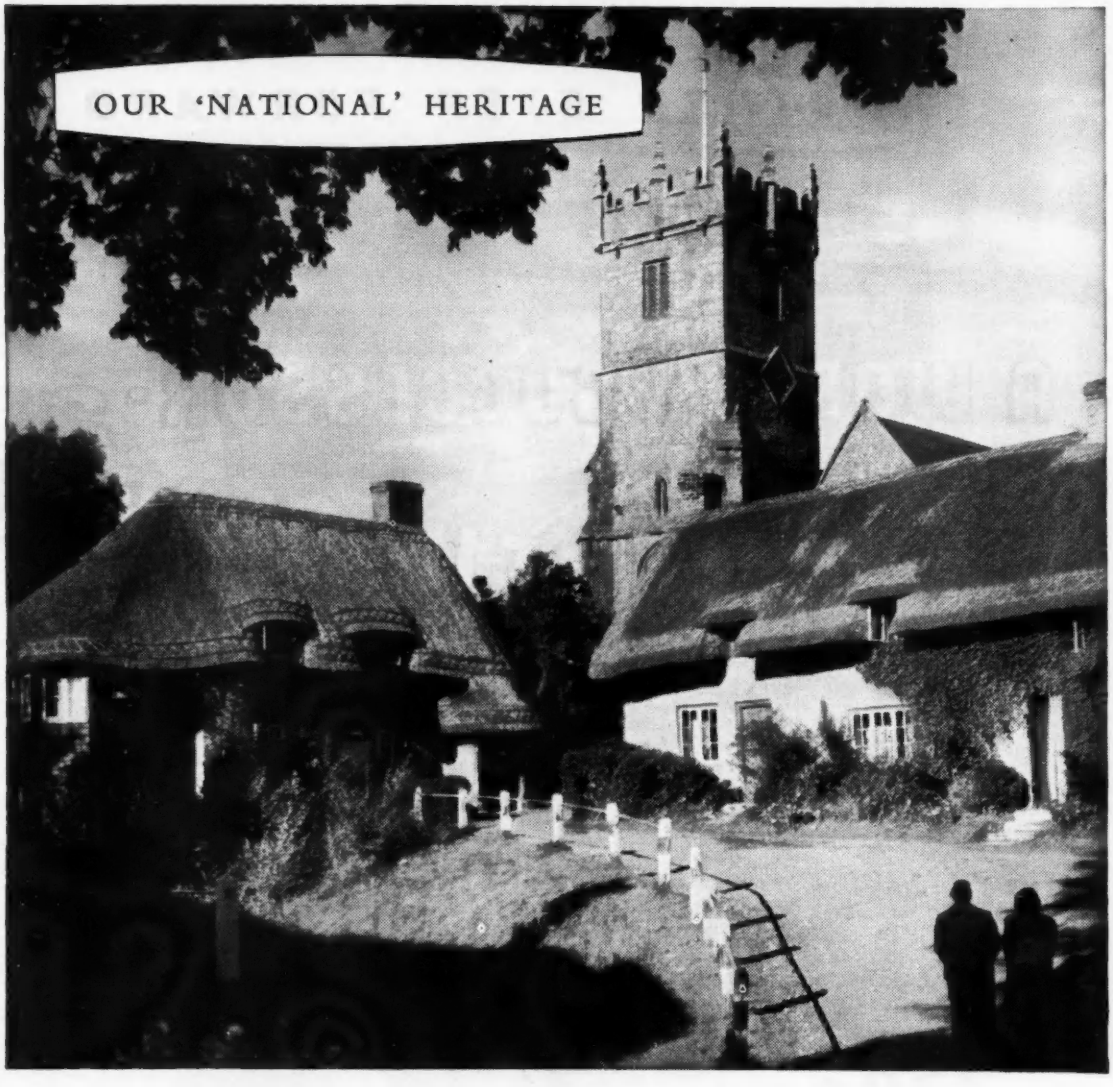
Export Trade

The Society continues to act as its services may be required by members in regard to export trade, though the long period during which the Society was responsible for steel authorisations for export business has now come to an end. From information available it appears that export business was better in 1953 than in 1952, but that there is still not complete recovery from the very serious effect of the restrictions imposed in the Australian market. Certainly the sellers' market has gone and a period of increasing international competition throughout the world appears to be inevitable. New fields that are opening up where bottled gas or natural gas are available offer scope for future development, and members of the S.B.G.I. are active in seeking to establish themselves in such markets.

Since the outbreak of war and during the post-war years industry has been in greater or less degree subject to Government control, and has been hampered consistently by regulations and shortages. These conditions are now changing and industry is experiencing a much greater freedom in which to deal with its many problems. The process of transition inevitably brings its own problems with it, but the hope and expectation is that they will be transient and that the productive capacity of the country will be all the healthier for the widening of the field of competitive enterprise.

The Most Urgent Need

The most urgent need still remains that of reducing taxation, and of giving thus an incentive to increased productivity. Our balance of payments problems can only be kept under control by a further increase in our exports, and this increase has now to be achieved in face of keen competition in international markets. During the past year inflation has been kept in check and the cost of living has become more stable, but any material rise in the nation's industrial costs level could jeopardise the whole structure. In conclusion the report says the activities of the Society have been possible only



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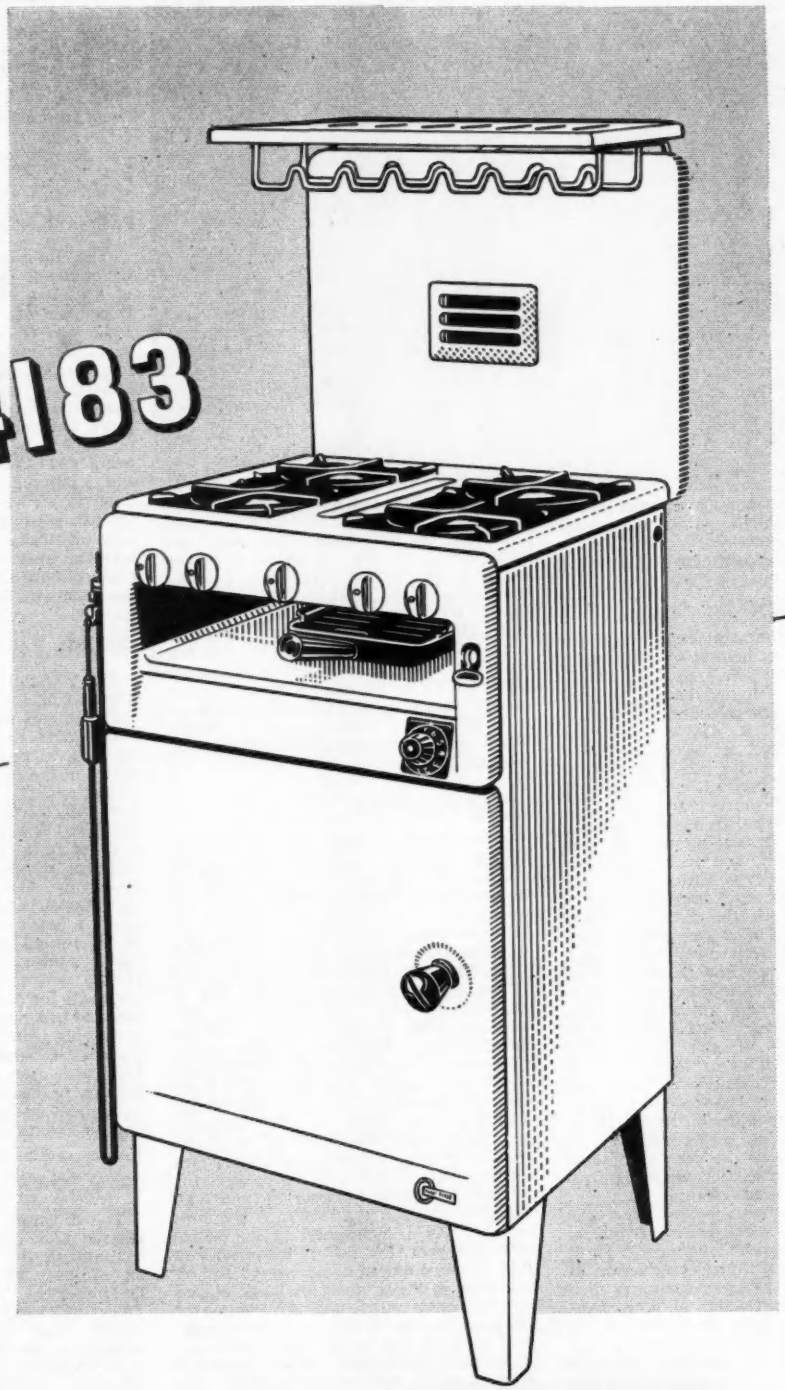

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because of the willingness of members to allow their personnel to give time and service in the wide range of activities involved, and the Council expresses thanks to the members for their loyalty and support.

For the year covered by the report, Sir Geoffrey Shakespeare succeeded Lord Baillieu as President of the Society; Colonel W. R. Glover followed Mr. W. H. G. Roach as Chairman of the Council; and Mr. J. Simpson was elected Vice-Chairman of the Council. At the annual meeting on May 25 Sir Ernest Smith was appointed President, Mr. J. Simpson Chairman of the Council, and Colonel W. E. Gibbons Vice-Chairman.

COMPANY NEWS

D. & C. AND WILLIAM PRESS

Mr. Gordon Roach and Mr. Montague Holbein, of D. & C. and William Press, Ltd., have concluded the purchase of the old established Canadian business of Ross-Meagher, Ltd., civil engineers and building contractors. Ross-Meagher will now exploit the gas line laying and other techniques in which the purchasers specialise. Only recently D. & C. and William Press in association with the Morrison-Knudsen Corporation secured the contract for laying the 350 mile Sui Natural Gas Line in Pakistan, a task which has to be completed by May of next year. They are also general contractors for both the civil engineering and mechanical erection for the £27 mill. extension of Anglo-Iranian's Llandarcy refinery.

GLOVER & MAIN

The annual general meeting of Glover & Main, Ltd., was held at 48, Grosvenor Gardens, London, S.W.1, on May 14. In his statement which had been circulated with the report and accounts, the Chairman, Colonel W. R. Glover, said the Company had had a successful year. Although on the meter side they did not have the record production of the previous year, they more than held their own in the industry. In the cooker field, they had had outstanding success with new modern types, and with the easing of the steel supply situation they had been able to increase considerably the production at both the Edmonton and Falkirk works. The consequent increase in turnover had been most satisfactory. Main Water Heaters had benefited from the lifting of the hire purchase restrictions and had been able to put the business into full production and with the development of new types, had greatly increased sales. Gloomy experts had foretold of recessions in trade and that we should be exposed to heavy competition from abroad, resulting in businesses operating with little or no profits. The answer to such conditions lay in increased efficiency, up-to-date research facilities, and modern buildings, plant, and equipment. Since the war they had already spent nearly £1 mill. in property, plant and equipment. Now, with demand outstripping production at Edmonton and Falkirk, authority had been given for extensions at both these works. A new block designed for research work had been under construction at Edmonton and no expense had been spared to equip it completely for the important function it had to perform. It had just been completed, and would serve R. & A. Main and also some other subsidiaries. Other recent extensions of activities included the formation of a new subsidiary called Main Refrigeration, which acquired important rights in Swedish refrigeration patents and a world-wide international organisation for research and development. Main Refrigeration is already producing domestic refrigerators in a small way and the problem of further factory accommodation in the near future is being considered.

COALITE & CHEMICAL

With a final recommended dividend of 7% (against 5%), Coalite and Chemical Products, Ltd., are raising the total for the year to March 31, 1954, from 8% to 10%, less tax. The trading surplus, after depreciation and debenture interest, amounts to £477,494, compared with £356,832, and the group net profit has increased from £152,827 to £183,267.

IMPERIAL CONTINENTAL

The Board of the Imperial Continental Gas Association has decided that for the year ended March 31, subject to the approval of the proprietors and the verification of the accounts by the auditors, an ordinary dividend of 12%, less tax, shall be paid on the £5,600,000 capital stock on July 10. Profit for the year after all charges except taxation were £873,976 against £811,820. United Kingdom taxation took £513,479 against £539,513. The balance proposed to be carried forward is £135,505 compared with £134,608. Belgian interests distributed a higher proportion of earnings than in the previous year.

DRAKES LIMITED

A dividend of 10% less tax on the ordinary shares is recommended by the directors of Drakes, Ltd., of Halifax, for the year ended December 31, 1953. The net profit for the year amounted to £11,953. After carry forwards and deductions the balance sheet shows that £57,177 is available to be carried forward to the next year as against £51,720 in the previous year. The Chairman, Mr. John A. Drake, in his statement with the accounts, says that the results again showed a drop in turnover from the peak which was reached after the war. Consequently, there was a drop in the profits. The high turn-over of the previous years was only achieved by a large amount of sub-contracting which brought a heavy increase in overhead charges for the staff necessary to supervise and take responsibility for the work. He continued: 'As I mentioned in my statement last year, the fall in turn-over has been to some extent compensated for by reduction in the amount of work placed with sub-contractors, and the volume of turn-over shown in the accounts is sufficient to keep our works fully employed. If normal prices can be obtained it would appear that such turn-over will more than cover our expenses and dividends, and this is confirmed by the increase in the carry forward this year of some £5,000.' Of the subsidiaries, Mr. Drake said the new subsidiary, Drakes of Halifax, Ltd., commenced to function during the latter part of 1953, and it was anticipated that by the end of 1955 all contracting activities of the parent Company would be completely transferred to the new subsidiary. The parent Company would then operate only as a holding company and as a supplier of services, such as transport, etc., to the group.

PARNALL (YATE)

The Board of Parnall (Yate), Ltd., recommends the payment of a dividend of 8%, less income tax, for the year to December 31, 1953. The dividend for 1952 was 6%. The net profit for the year after tax is £27,875. Total capital reserves has increased from £360,000 to £538,000. The statement of the Chairman, the Earl of Limerick, says the profit figures are much in excess of the previous year, the trading profit for 1953 being £193,194, compared with £37,994; and it should be remembered that the latter figure was computed after charging against contingency reserve the excess cost of stocks of raw materials of one subsidiary, amounting to £34,856. The net profit before taxation, of the Group, has improved from £6,111 to £139,042.

BRITISH VACUUM CLEANER

The British Vacuum Cleaner and Engineering Co., Ltd., has entered into arrangements with John Thompson, Ltd., boiler makers and general engineers, for the sale to the latter Company of its shares in the subsidiary, B.V.C. Industrial Constructions, Ltd. John Thompson, Ltd. will, through the subsidiary, control the installations under contracts entered into for fully fixed pneumatic boiler-ash and grit removal plant and hydraulic conveying installations. B.V.C. Industrial Constructions, Ltd., will become, under a new name, a subsidiary company of the John Thompson Group for undertaking contracts for such plant, and this Group will thus in future carry out contracts for fully fixed pneumatic boiler ash and grit removal plant and hydraulic conveying installations. The British Vacuum Cleaner and Engineering Co., Ltd., will, *inter alia*, continue the manufacture of heavy duty vacuum cleaning equipment and ancillary and allied plant and air exhauster units.

CAPE TOWN

The directors of the Cape Town and District Gas Light and Coke Company, recommend the payment of a dividend on ordinary stock for the year ended December 31, 1953, of 6½%, less tax. The credit balance after debenture stock interest and depreciation is £18,464. Adding to this the £7,718 brought forward from the previous year the total available is £26,182. Sir George L. Barstow, Chairman, in a statement with the accounts, says that the profit and loss account for the year shows that total charges on all accounts increased by £9,847, while total income from all sources rose by £6,688 resulting in the balance available being less by £3,159 than in the previous year. Costs of raw materials and services continued to rise and were out of control, added Sir Barstow. The falling off in the quantity of gas sold by 4% was largely due to less demand from the canning industry, one of the biggest customers, which was considerably below normal.

Scaffolding Accidents

At the May meeting of the London Building and Engineering Contractors' Accident Prevention Group, Mr. Norman Elliott, Company Engineer, of Scaffolding (Great Britain), Ltd., gave a paper on 'Safety Aspects in relation to Tubular Scaffolding.'

Speaking from his extensive and expert knowledge of scaffolding, Mr. Elliott referred to the misuse of scaffolds and emphasised the importance of realising the limitation of scaffold tubes—particularly alloy. In connection with the construction of scaffolds, he spoke of the importance of knowing where the weakest point lies and assessing the load accordingly.

Where it is intended to use the scaffolding for such special purposes as carrying concrete roof members, Mr. Elliott said it was important that an expert engineer should make a stress analysis.

Stockholders' Representatives

The Minister of Fuel and Power, in exercise of his powers under the Gas Act, 1948, has made the Gas (Stockholders' Representative) (Amendment) Regulations, 1954 (Statutory Instrument 1954, No. 525). Regulation 17 of the Gas (Stockholders' Representative) Regulations, 1948, provides for the calling by the stockholders' representative of a meeting of the holders of securities, at the conclusion of which the stockholders' representative shall stand discharged as therein provided.

It appears, as a result of certain legal proceedings, that in some cases holders of securities may be entitled to the distribution of further sums and, where a meeting under Regulation 17 has been concluded, doubt has arisen as to the status of the stockholders' representative in relation to such sums.

These amending regulations enable the Minister of Fuel and Power to reappoint such stockholders' representative or to appoint another person as stockholders' representative in his place.

Scottish Bowling Match

The Scottish Association of Gas Managers' Bowling Club met the Scottish Gas Board (Edinburgh Division) at Granton on May 22, when 44 players took part. The weather was disappointing at the beginning of the game, but the condition of the green was excellent, and some keen matches took place, two rinks finishing all square after 21 ends. The Edinburgh Division were the winners, being 121 shots up against the Scottish Association total of 95 shots up. After the match the players assembled for high tea at the Peacock Inn, Newhaven.

Mr. W. T. Gilchrist, Cowdenbeath, spoke on behalf of the Scottish Association of Gas Managers' Bowling Club and said he was deputising for the President who was absent through illness. He referred to the challenge made by the Edinburgh Division to play the match, and assured them that his Club was very pleased to accept, as it gave an opportunity to entertain the members of Granton Bowling Club, which they were now doing to show their appreciation for the many times they had received hospitality in the past at their annual general meetings. The Scottish Association of Gas Managers' Bowlings Club was now more than 25 years old.

FRENCH EXPERTS SEE ROCHDALE PROCESS

Four gas experts from France visited the North Western Gas Board's Bollington works on May 26 to see the latest developments of the Board's new 'Rochdale Process' to which production plant at the works has been converted. Here, the French visitors are being shown details of the process by the Board's chief technical officers. In the group are, left to right, Mr. F. Litler, Deputy Chief Technical and Planning Officer; M. Queret, Gaz de France; M. Delarue, Cie Generale de Construction de Fours; M. Meslan, Gaz de France; M. Monot, C.G.C.F.; Mr. William Hodkinson, Chief Technical and Planning Officer; and Mr. Thomas Nicklin, Production Engineer.

Preview of New Cooker

The Shire Green, Sheffield, branch of the Women's Gas Federation paid a visit to the works of Thomas De La Rue & Co., Ltd., at Warwick on May 4. The visitors, approximately 70 strong, arrived in two coaches at the Woolpack Hotel, Warwick, where they were welcomed at a luncheon by Mr. E. J. Alleyne, Midlands Area Sales Manager. Arriving at the works after lunch the guests formed into small groups and visited the various departments of the factory, each group having a member of the De La Rue staff as a guide. Among the departments visited were the foundry, enamelling shop, machine shop, boiler assembly shop, and cooker assembly shop, where the visitors watched the new coloured G4 cookers being assembled, and were shown the new De La Rue 'Warwick' cooker, which will be generally available in August.

Included in the party were Mrs. Jubb, Chairman of the Branch, and Miss Dyson, Secretary, and accompanying the ladies were four men, Mr. F. E. Sheldon, Assistant Manager No. 2 District, Mr. T. Hyam, Mr. S. H. Marrison, and Mr. H. Adams.

Gas Exhibitions in Eire

Successful exhibitions of modern gas appliances were held at Waterford and Kilkenny during May. Attendance figures were high and the visitors displayed a lively interest in the many exhibits and practical demonstrations of appliances. A series of cookery demonstrations by Miss Helen Main, Diplomee Cordon Bleu (Paris), M.C.A., M.H.C.I., Chief Demonstrator of R. & A. Main, Ltd., was a popular feature of both exhibitions. Her audiences were particularly interested in the many simple practical dishes included in her programme.

At Waterford, special invitations to attend Miss Main's demonstrations were sent to convents and to establishments using large-scale equipment, and met with a good response. Parties of students from the domestic science classes of the various convents attended daily and the displays of large-scale cooking apparatus were studied with considerable attention.

Cake baking competitions were a feature of both exhibitions and prizes of No. 2 'Thermain' sink water heaters, 'Glowmain' portable fires, gas irons, and gas pokers were awarded by the undertakings concerned.

Diary

June 12.—MANCHESTER JUNIORS: Visit to Burnley Gasworks. 'The Design and Performance of 0.5 mill. cu.ft./day Tully Carburetted Complete Gasification Plant,' G. R. Spence, G. Wheatman and I. J. Hartill.

June 14.—NALGO CONFERENCE: Meeting of Gas Staffs. Scarborough.

June 15-18. — NATIONAL AND LOCAL GOVERNMENT OFFICERS ASSOCIATION CONFERENCE: The Spa, Scarborough.

June 15. — LONDON AND SOUTHERN SECTION, I.G.E.: Summer Meeting.

June 18.—SCOTTISH JUNIORS (WESTERN): Golf Outing.

June 19.—LONDON JUNIORS: Ladies' Day at Hastings.

June 22-25.—ROYAL HIGHLAND AGRICULTURAL SHOW: Dumfries. Gas Council exhibit.

June 24.—NORTH THAMES G.C.C.: Caxton Hall, Westminster, 2.30 p.m.

June 25.—MIDLAND SECTION, I.G.E.: Summer Meeting. Nottingham.

June 26.—MANCHESTER JUNIORS: Ladies' Day at New Brighton.

July 1.—MIDLAND JUNIORS: Ladies' Day.

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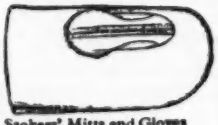
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The " Gas Journal " is published every Wednesday, price 1/3d.; by post 1/5d.

Subscription Rates: Home and Empire:—52/- per annum; Foreign:—60/- per annum. (Both payable in advance.) A copy of the " Gas Journal " Calendar & Directory is presented each year to continuous subscribers.

Classified Advertisements: All small classified advertisements are charged at 1/9 per line (approx. 7 words)—minimum charge 10/6. A Box Number address occupies 2 lines, and a further 6d. is charged towards cost of postage on replies. Copy must be received by first post on Monday to ensure insertion in that week's Journal.

Displayed Advertisements: Rates obtainable on application to the Business Manager. Change of copy for displayed spaces must be received 14 days prior to publication if proofs are required. Type area of inside pages 10" deep × 7" wide; block screen 120.

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MIDLANDS MANAGER: G. B. Torrance, 42, Wychall Lane, King's Norton, Birmingham, 30.

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APPOINTMENTS VACANT

The engagement of persons answering these advertisements must be made through a Local Office of the Ministry of Labour or a Scheduled Employment Agency if the applicant is a man aged 18-64 inclusive or a woman aged 18-59 inclusive unless he or she, or the employment, is excepted from the provisions of the Notification of Vacancies Order, 1952.

LANCASHIRE Manufacturers of Gas-heated Wash Boilers and Washing Machines require experienced Representative resident in Lancashire or Yorkshire, to cover the North Western and North Eastern Gas Board Areas. Applicants should state age, qualifications, experience and salary required and be able to submit highest references. All applications will be treated in strictest confidence. Apply: No. 201, *Gas Journal*, 11, Bolt Court, Fleet Street, London, E.C.4.

AGENT required for supervision of district gas and water mainlaying contracts. Knowledge o reinforced concrete reservoirs desirable. Apply by letter stating age, salary and full particulars of experience to: R. E. Docwra, Ltd., Public Works Contractors, Llanover Road, Wembley, Middlesex.

NORTH WESTERN GAS BOARD

PRESTON GROUP

GROUP INDUSTRIAL GAS ENGINEER

APPLICATIONS are invited from trained and qualified engineers for the above pensionable appointment at a commencing salary of £1,000 per annum.

Applicants should have full knowledge of the utilisation of gas and other fuels in industrial and commercial establishments, together with wide experience of the design, development and operation of industrial and commercial gas burning equipment.

Detailed applications, giving the names of two referees, should reach the General Manager, North Western Gas Board (Preston Group), 108 Fishergate, Preston, within fourteen days.

WANTED AT ONCE, a young experienced man to work as ASSISTANT to the TAR WORKS MANAGER. Applicants must have had some training in a modern Tar Distillery, and have had experience with Pipe Stills. The applicant must have had sound education, have chemical qualifications, and be really alert and active.

When applying, please give details of education, technical training and qualifications obtained, a brief account of experience in Tar Works, and when available for duty.

The post would carry a salary of not less than £750-£850 per annum, depending on age, experience, etc., is pensionable under a non-contributory scheme, and, if necessary, assistance in housing would be available.

Apply in writing to Plymouth Tar Distilleries Limited, Eling House, Totton, Southampton.

(*Classified Advertisements continued on page* 646)

APPOINTMENTS VACANT (ctd.)

WEST MIDLANDS GAS BOARD

APPLICATIONS are invited for appointment as SECRETARY of the BOARD as the present Secretary is retiring in a few months' time. Candidates shou d have had wide administrative experience preferably with a Public Utility or Public Board.

The post is pensionable and the Interchange Rules apply in appropriate cases. The commencing salary is £2,500 per annum. The person appointed will be required to work for a time with the present Secretary.

Applicaions, giving full details of qualifications and experience and the names of three referees, should reach the Chairman by July 5, 1954. Envelopes should be marked 'Secretary' in the top left-hand corner.

F. H. CURETON,
Secretary.

6, Augustus Road,
Edgbaston,
Birmingham, 15.

SOUTHERN GAS BOARD

WESTERN DIVISION

APPLICATIONS are invited for the position of SENIOR GENERAL ENGINEERING DRAUGHTSMAN at the Pitwines Works of the Bournemouth Gas Undertaking.

In addition to general mechanical engineering training, applicants should have a good knowledge of structural steel and reinforced concrete work, including the taking out of quantities and the preparation of Specifications. A knowledge of Gasworks' Plant layout, etc., will be an advantage.

The salary will be in accordance with A.P.T. VIII (Provincial 'A') of the salary scales of the National Joint Council for Gas Staffs, *i.e.* £605-£685 per annum, according to qualifications and experience.

The successful applicant will be required to undergo a medical examination and also to join the Southern Gas Board Staff Pension Scheme.

Applications, giving full particulars of age, training, experience and qualifications, to be submitted to the undersigned on or before Monday, June 28, 1954.

J. C. HOGG,
General Manager.

Bournemouth Gas Undertaking,
136, Old Christchurch Road,
Bournemouth.

SOUTHERN GAS BOARD

EASTERN DIVISION
PORTSMOUTH, GOSPORT AND
BOGNOR REGIS GAS UNDERTAKING
SENIOR ACCOUNTANCY ASSISTANTS

APPLICATIONS are invited from suitably qualified persons for these posts in the above undertaking.

Two vacancies exist and the responsibilities include the preparation of the Group Financial Accounts and Costing Records in the one case and the control of an expanding Machine Accounting Section, using 'National' accounting machinery, in the other.

Applicants should have had experience in administration and the control of staff.

Both positions will be graded within the A.P.T. Grades IX and X of the Scales of the National Joint Council for Gas Staffs for Provincial 'A' Undertakings, the Salary range being between £635 and £790 per annum.

Each successful candidate will be required to pass a medical examination and, unless already subject to a Pension Scheme by virtue of the Gas (Pension Rights) Regulations, 1950, will be required, if eligible, to join the Board's Staff Pension Scheme.

Applications detailing age, experience and qualifications, and accompanied by a one page summary of these items, should be forwarded to the undersigned not later than June 21, 1954, and marked 'Accountancy Assistant'.

H. M. LAWRENCE,
Engineer and General Manager.

The Square,
Portsmouth.
June 2, 1954.

REPRESENTATIVE who is already calling on the DISTRIBUTION side of Gas Industry, offered an additional well established line on generous commission basis.

Write in first instance stating area covered, to: No. 202, *Gas Journal*, 11, Bolt Court, Fleet Street, London, E.C.4.

WEST MIDLANDS GAS BOARD

WORCESTERSHIRE AND HEREFORDSHIRE
DIVISION
REDDITCH DISTRICT
VACANCY FOR
HOME SERVICE ADVISER

CANDIDATES should have had at least a two years' training in Domestic Science and hold an appropriate diploma. Some practical experience in demonstrating would be an advantage.

The salary for the post will be within Grade V (£384-£448 per annum) of the National Salary Scales for Gas Staffs.

The post is pensionable and the successful candidate may be required to pass a medical examination.

Applications, stating age, and giving details of education, qualifications and experience, together with the names of two referees, should be addressed to Mr. C. F. W. Rendle, Divisional General Manager, West Midlands Gas Board, Gas Offices, 12 St. Nicholas Street, Worcs., to reach him within fifteen days of the appearance of this advertisement.

F. H. CURETON,
Secretary to the Board.

EASTERN GAS BOARD

CAMBRIDGE DIVISION
TECHNICAL ASSISTANT—DISTRIBUTION

APPLICATIONS are invited for the position of TECHNICAL ASSISTANT (DISTRIBUTION) at the Divisional Chief Office, Cambridge.

Candidates should possess the Institution of Gas Engineers Higher Grade Certificate in Gas Engineering (Supply) or equivalent qualification, and in addition to practical experience of mains and service work (low and high pressure) should have experience in the design and layout of distribution systems, the estimation of costs, and the preparation of mainlaying specifications.

Some drawing office experience will be an advantage.

The successful candidate will be required to assist the Distribution Engineer in planning, estimating and supervisory work on mainlaying schemes within the area of the Cambridge Division.

The commencing salary will be within Grade A.P.T. VII (£565-£645 per annum) with placing according to qualifications and experience.

The successful candidate may be required to pass a medical examination and unless already subject to a Pension Scheme by virtue of the Gas (Pension Rights) Regulations, 1950, will be required, if eligible, to join the Board's Staff Pension Scheme within six months from taking up the appointment.

Applications stating age, qualifications and experience, and giving the names of two referees should reach the undersigned not later than fourteen days after the appearance of this advertisement.

J. HUNTER-RIOCH,
General Manager.

52, Sidney Street,
Cambridge.

AGENCY

AGENTS required for sale of Syphon Pots, Surface Boxes, etc.; good commissions. Apply: No. 197, *Gas Journal*, 11, Bolt Court, Fleet Street, London, E.C.4.

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WANTED—Recovered or used Mercury from 14s. lb. delivered, according to quantity: or cash on collection arranged Greater London area: also precious and non-ferrous scrap metals, and in all forms. Belgrave Buyers (G.J.), 5, Belgrave Gardens, London, N.W.8. MAI 7513.

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TENDERS are invited for the above Contract from Contractors experienced in the laying of large cast iron and steel mains for water and gas.

The contract covers the laying of approximately 6,000 lineal yards of 24 in. dia. spun iron water main from Lake Street to Brasenose Reservoir and of approximately 7,200 lineal yards of 24 in. diameter spun iron gas main from Oxford Gas Works to Cowley, with ancillary works to both mains. For a distance of 2,755 yards the two mains will be laid in a common trench, and steel mains will be laid at two river crossings.

Contract documents can be obtained from the City Water Engineer, 65 St. Aldate's, Oxford, on payment of Five Guineas, which will be returned on receipt of a bona-fide tender.

Sealed Tenders must be returned to reach the undersigned by 10.00 a.m. on Thursday, July 1, 1954.

The Council does not undertake to accept the lowest or any tender.

H. PLOWMAN,
Town Clerk.

Town Hall,
Oxford.

MISCELLANEOUS

WATER-CONTENT TEST — 3 MINUTES — Already in use in the gas industry, "SPEEDY" MOISTURE TESTER gives accurate results with coal, coke and ash, and many chemicals. Needs no electricity; no skill. Portable. Write for illustrated brochure or order direct £24 10s. 0d. complete.—Thos. Ashworth & Co., Ltd., (Dept. G.J.), Basket Street, Burnley, Lancs.

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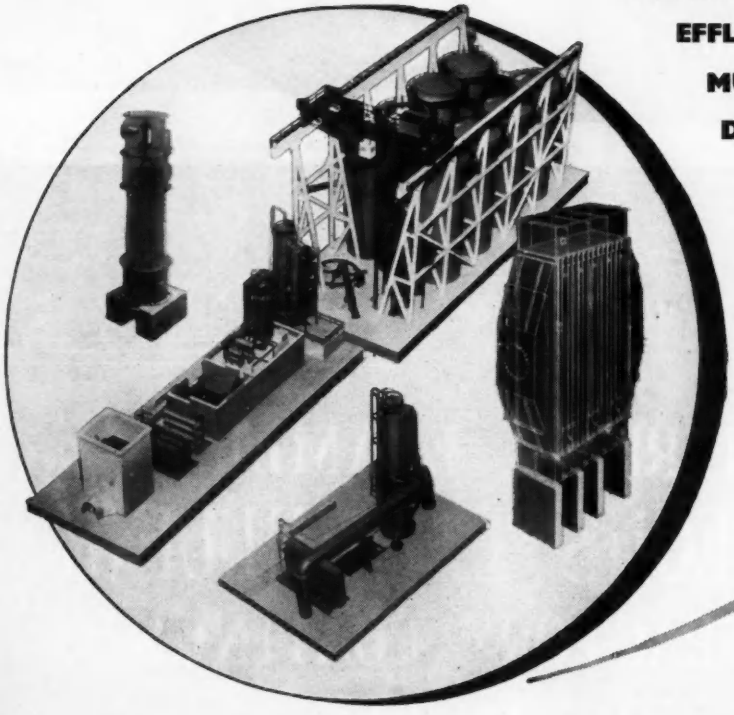

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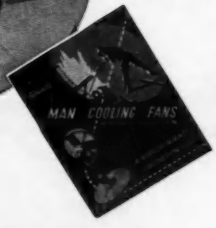
The "Tornado" method of man-cooling definitely encourages production all the time. Man-cooling fans deliver, for as long as is necessary, a brisk, cooling air current which relieves excessive body heat and improves breathing conditions. Designed particularly for use in the "heavy" trades they combine an easy portability with robust construction — two essential characteristics.

If your concern is for workers in iron and steel works, foundries, boiler houses, gas retort houses, glass works or "lighter" industries where efficiency is bound up with the maintenance of comfortable working conditions then you should see Publication No. 9/7.

A copy is waiting for you.



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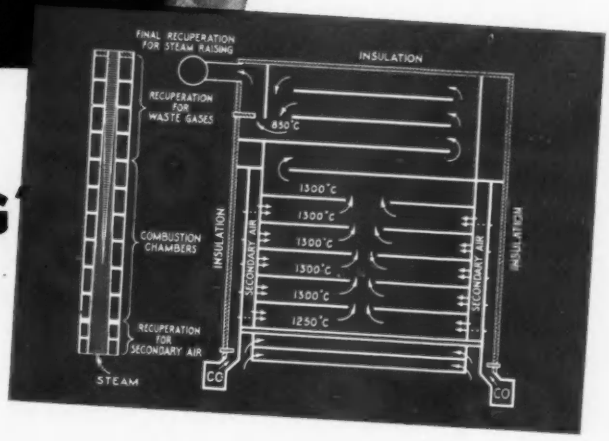

'BALANCED HEATING' saves fuel

"Balanced Heating", a feature of the Glover-West continuous vertical system of carbonization, reduces fuel consumption to a level hitherto unobtainable. In the "Balanced Heated" setting, producer gas enters the combustion chambers from *both* sides and retorts are evenly heated by *primary* combustion. Combustion proceeds towards the centre of the setting, heat transmitted to the outer walls being recovered in the producer gas and air uptakes and returned to the system. Control of temperature in individual combustion chambers gives greater flexibility—an important factor today when many different coals are handled by one plant.

★*Illustration shows a "Balanced Heated" setting under construction*

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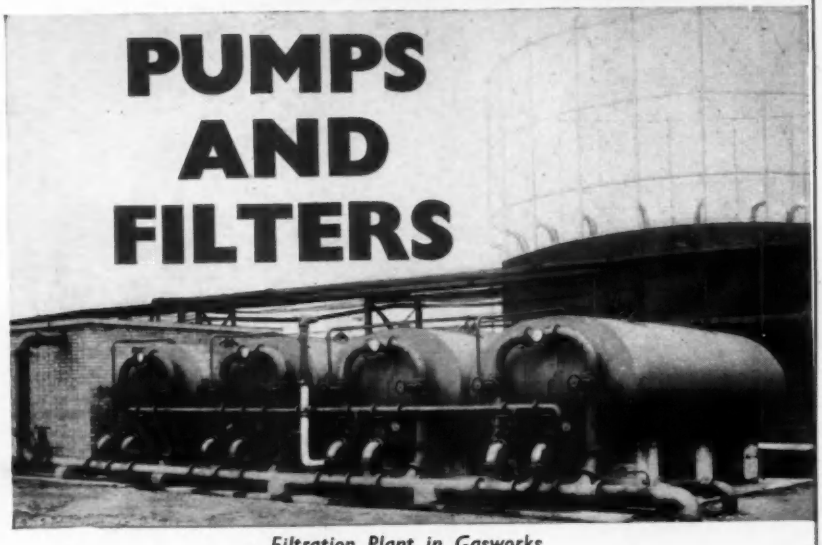
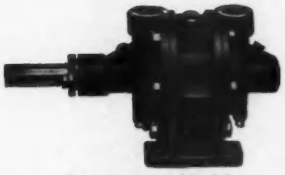
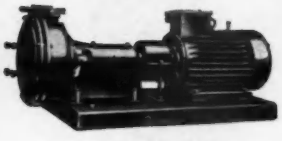


Filtration Plant in Gasworks

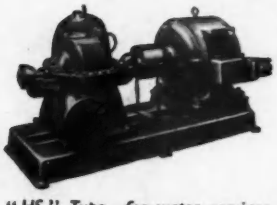
The illustrations show centrifugal pumps for light and heavy oil and liquor duties, stoneware and special metal pumps for handling acids and alkalis, pumps for circulating and washer duties, for clean water and fire services and for liquids containing abrasives.



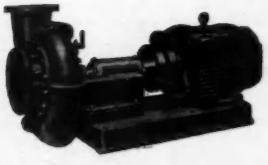
Rotary pump for Oil transfer duties



Stoneware pump for Corrosive and chemicals

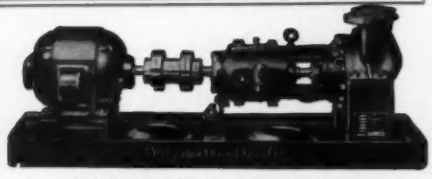


"HS" Type—for water services. All heads up to 500 feet.

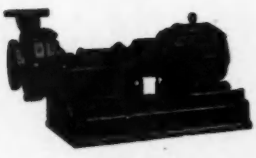


Slurry pump for coal washing and abrasive liquids.

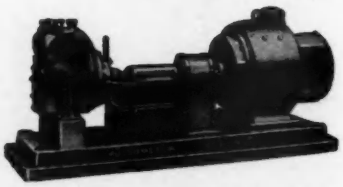
Reciprocating pump of modern design for Gas Works.



Pulsometer—Pacific type, based on latest American practice.



"JA" & "JB" types for high temperature water circulation.



Self priming centrifugal pumps.

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